ROADS and STREETS

HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION

A GILLETTE PUBLICATION

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COMP-11-59

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October, 1959

THE MULTIPLE
JACKSON
UNMATCHED FOR VERSATILITY and RAPID ACHIEVEMENT OF SPECIFIED DENSITY!
VIBRATORY COMPACTORS • MULTIPLE & TRAILER TYPES

Each of the compactor units employed in the workheads of these machines supplies FORTY-TWO HUNDRED 6,000 lb. VIBRATORY BLOWS PER MINUTE and achieves maximum density of any granular material used in base courses and fills in the fastest possible time.

Each compactor unit may be operated independently and hence units may be detached from the maximum coverage arrangement of 6 units in the workhead (13', 3") to ideally fit each job; or they may be regrouped in a wide variety of tandem arrangements for more rapid densification of narrower areas. And in the case of the TRAILER COMPACTOR as many as eight compactor units may be employed in two workheads of 4 each — one in front and the other following the trailer.

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Used on nearly all of the nation's major highway projects, including the AASHO Test Road, the JACKSON MULTIPLE COMPACTOR has thoroughly demonstrated the outstanding advantages of this method of compaction. With the advent of the JACKSON TRAILER COMPACTOR it is conveniently adaptable to paving projects of nearly every type and size.

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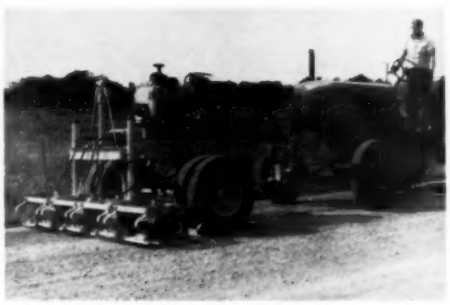

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We'll be glad to send you full details about Beth-Cu-Loy culvert sheets, as well as the names of fabricators who form them into pipe. Just call or drop a line to the nearest Bethlehem district office.

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ROADS AND STREETS

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With his rented truck, is he an employee? The Labor Departments claim so. See next month's detailed report of discussion on this vital matter, which took place at AGC's midyear board meeting in Kansas City.

New Kind of Concrete Spreader

Wisconsin contractor has come up with a novel spreader, which worked fine with transix-mix concrete delivery for an Interstate project.

"Show Case" Earthmoving Job

Chantilly airport which will bring Jets to Washington, D.C., was scene of 50,000 cubic yard daily earthmoving pace in recent months. Methods and equipment of C. J. Langenfelder & Son, Inc., will be reviewed.

Flexible Base Production - West Texas Style

How a Texas contractor specializes in turning caliche into specification material for area road projects, using three high-production aggregate plants, rubber-tire mounted.

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GET BIG-TIRE SPECIAL SERVICE. Goodyear Big-Tire Specialists go *all* the way. They'll help you set up an operating and maintenance program to keep your tires in top condition *all* the time, and for longer life, too.

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And BIG-TIRE PERFORMANCE! Example: SURE-GRIP LUG

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You'll be ahead if you see your nearby Goodyear dealer—or write: Goodyear, Truck Tire Dept., Akron 16, Ohio.

Sure-Grip—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

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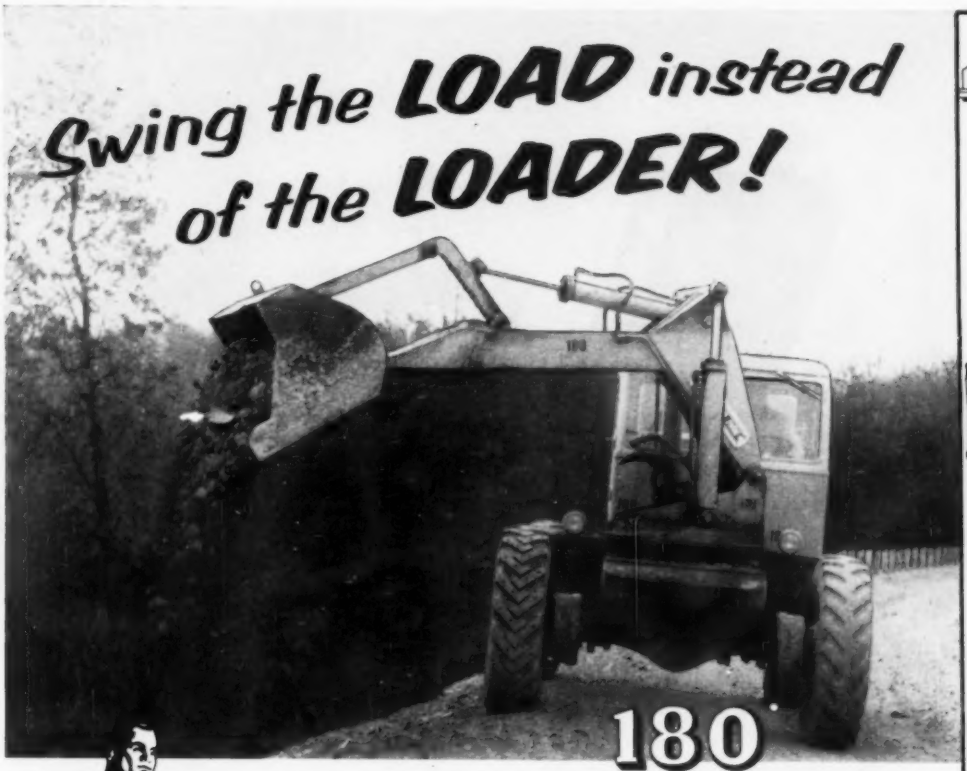

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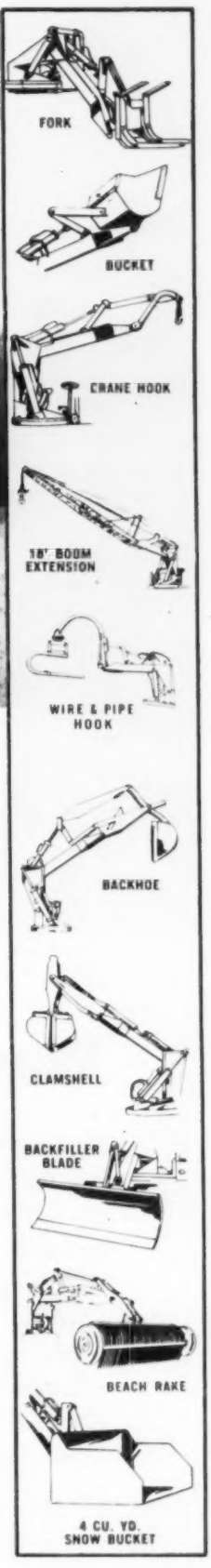
ALL-PURPOSE MATERIAL HANDLER

The Pettibone 180° Speed Swing answers every need on your job schedule because it combines the best features of all material handling equipment in *one* machine. This gives you *all-job versatility*, plus exclusive swinging boom performance.

The turning and maneuvering requirements of conventional loaders are now eliminated by the Pettibone Speed Swing because you swing the load instead of the loader! This means *faster, safer, more efficient handling!*

It cuts your time and labor costs. You eliminate the need for extra equipment investment, all of which adds up to a more profitable operation for you!

Shown above the Speed Swing is working parallel to the shoulder and dumping material over the bank. This eliminates the possibility of the loader tumbling over the bank and endangering the operator. Shown at right, 10 quickly interchangeable attachments (by changing *only* 3 pins) make the Speed Swing the *most adaptable, most versatile* all-purpose material handler today!



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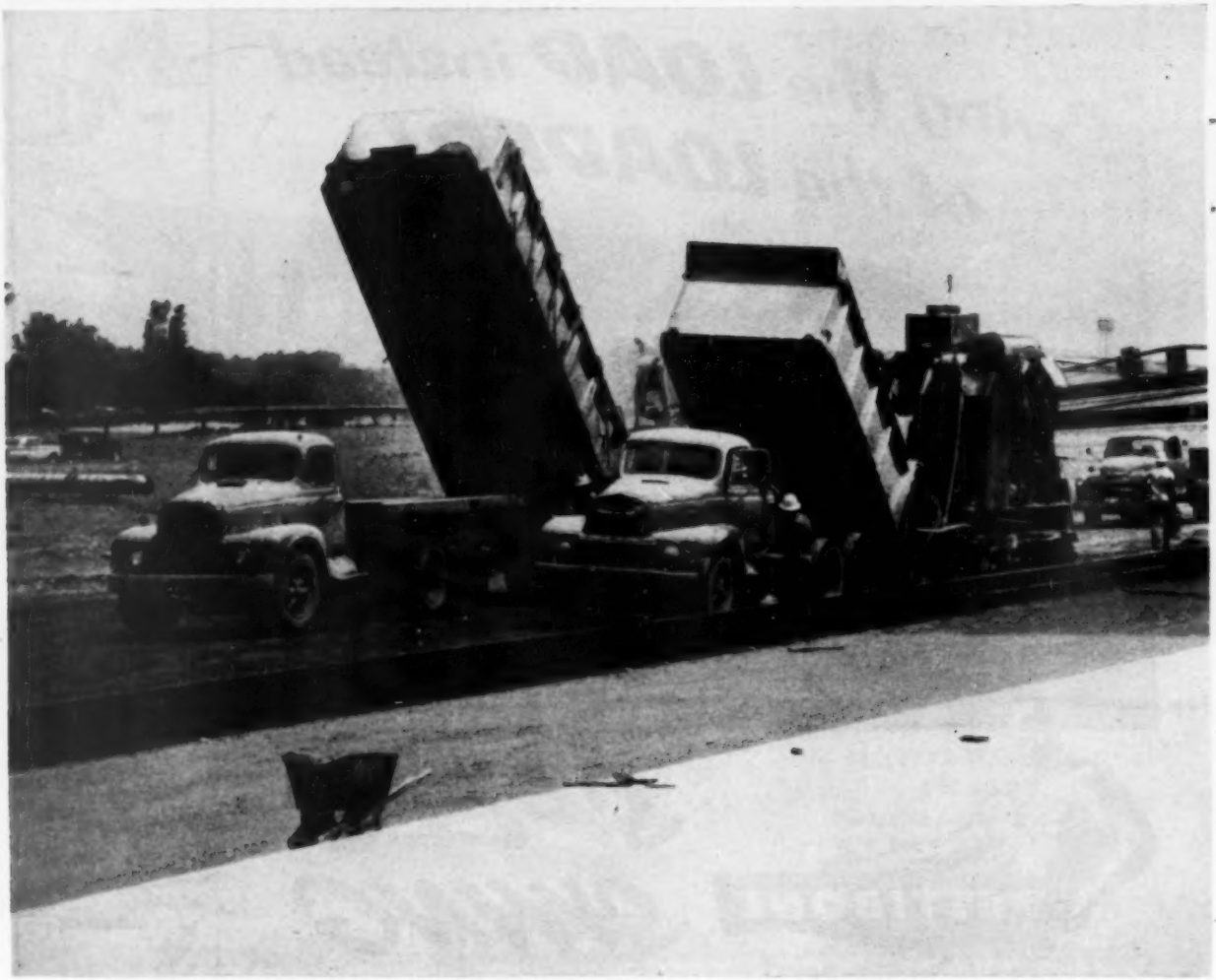

Western moved and replaced over 4 million yards of earth in building special $13,000,000 Jet runways for S.A.C. at Wright-Patterson A.F.B. Western is pushing for November 1959 completion of runway, ramp and taxi areas. They're using Texaco 100%.

Western uses Texaco Lube Plan

Problem: build a runway two miles long, two feet thick, and tough enough to take the landing shock of planes as heavy as a locomotive—a priority project that must be finished early in 1960. Western Contracting Corporation, Sioux City, Iowa, is moving ahead on this one right now, at the new $22-million Strategic Air Command Wright-Patterson Air Force Base near Dayton, Ohio. And to help make sure they finish on schedule, Western relies on a Texaco Simplified Lubrication Plan.

Here's how it works. The Texaco Plan cuts total lube inventory down to six products. That way, each of Western's lube rigs is a complete service station on wheels, able to lubricate every piece of equipment, wherever it is.

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Western's Texaco Plan enables mobile rig to handle all major lubrication in the field—eliminates wasteful deadheading.

to pave the way for S.A.C.

manhours in storage and handling. It cuts paper work in ordering. And every lubricant in Western's Texaco Plan was chosen to meet the specific requirements of the job.

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Fill Canyon Erosion "Slivers" to Build City within a City

Almost ten years ago, two far-sighted land developers—Louis Burgener and Carlos Tavares—began changing the then barren Clairemont Mesa, seven miles north of the heart of San Diego, California, to a planned village within the city. Today, with the help of Allis-Chalmers construction machines, Clairemont has grown to a city within a city. The present 45,000 to 50,000 population is expected to reach 70,000 by the end of 1960 . . . and eventually will be one of the largest planned communities in the United States.

Complete community facilities

The city of Clairemont, located within the city of San Diego, is being developed in units of 100 to 200 lots. It now contains, in addition to 12 to 13,000 homes (75% single-family), two shopping centers, one senior high school, two junior high schools, fifteen elementary schools, fifteen churches, two parks and a library.

A. H. Johnson handling current dirt work

A. H. Johnson, working for prime contractor R. E. Hazard Contracting Company, is using Allis-Chalmers torque converter crawler tractors and Allis-Chalmers motor scrapers on the rip-cut-fill work to prepare a unit of 100 sites. He is leveling, filling and terracing lots and cutting streets in material that runs from sandy loam to a tough conglomerate of cobblestone and dobe. In the early stages of this unit, the material was so abrasive even the toughest ripper teeth had to be replaced frequently.

A. H. Johnson
Lakeside, California

Fills carefully compacted

Clairemont Mesa is cut by canyons with eroded "slivers" along each side. These slivers are filled and compacted . . . carefully checked every foot of lift . . . to create good, stable homesites along trim, scenic canyons.

Johnson's Allis-Chalmers torque converter crawlers provided the big power necessary to rip the toughest material on the mesa. They also push-loaded the Allis-Chalmers motor scrapers. Most of the motor scrapers are hydraulic

An Allis-Chalmers TS-360 takes a load into one of the numerous sliver fills. The 5x5 compactor, right, is constantly at work on the fill, which is checked every foot of lift.

AC ...move ahead with

One of Johnson's Allis-Chalmers hydraulic scrapers is push-loaded by a turbocharged HD-21. These fast-loading motor scrapers used their hydraulic down pressure and short turning radius to good advantage in the tough material and tight fills.

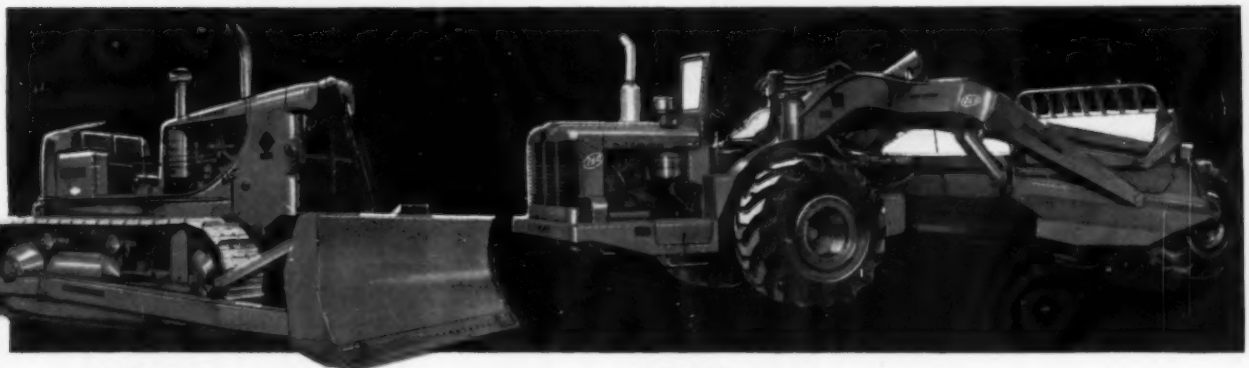
units which used their double-acting bowl jacks to good advantage biting down into the material and getting loads that paid on every pass. Double-acting bowl jacks are available as standard equipment only on Allis-Chalmers hydraulic motor scrapers..

The fact that Johnson's Allis-Chalmers TS-260 motor scrapers feature 90-degree steering and require less turning area than any make of comparable size (less than 31 feet) was a real timesaver in the close quarters of the numerous sliver fills.

A. H. Johnson has found . . . as

The 225-hp, turbocharged HD-21 rips the cut to speed loading.

thousands have . . . that Allis-Chalmers construction machinery is designed with the tough jobs in mind. Select the correct units for your next jobs and see them in action. Your Allis-Chalmers construction machinery dealer will arrange the details. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.



HD-21 225 net engine hp—torque converter drive **TS-260** 230 hp, 17 yd heaped

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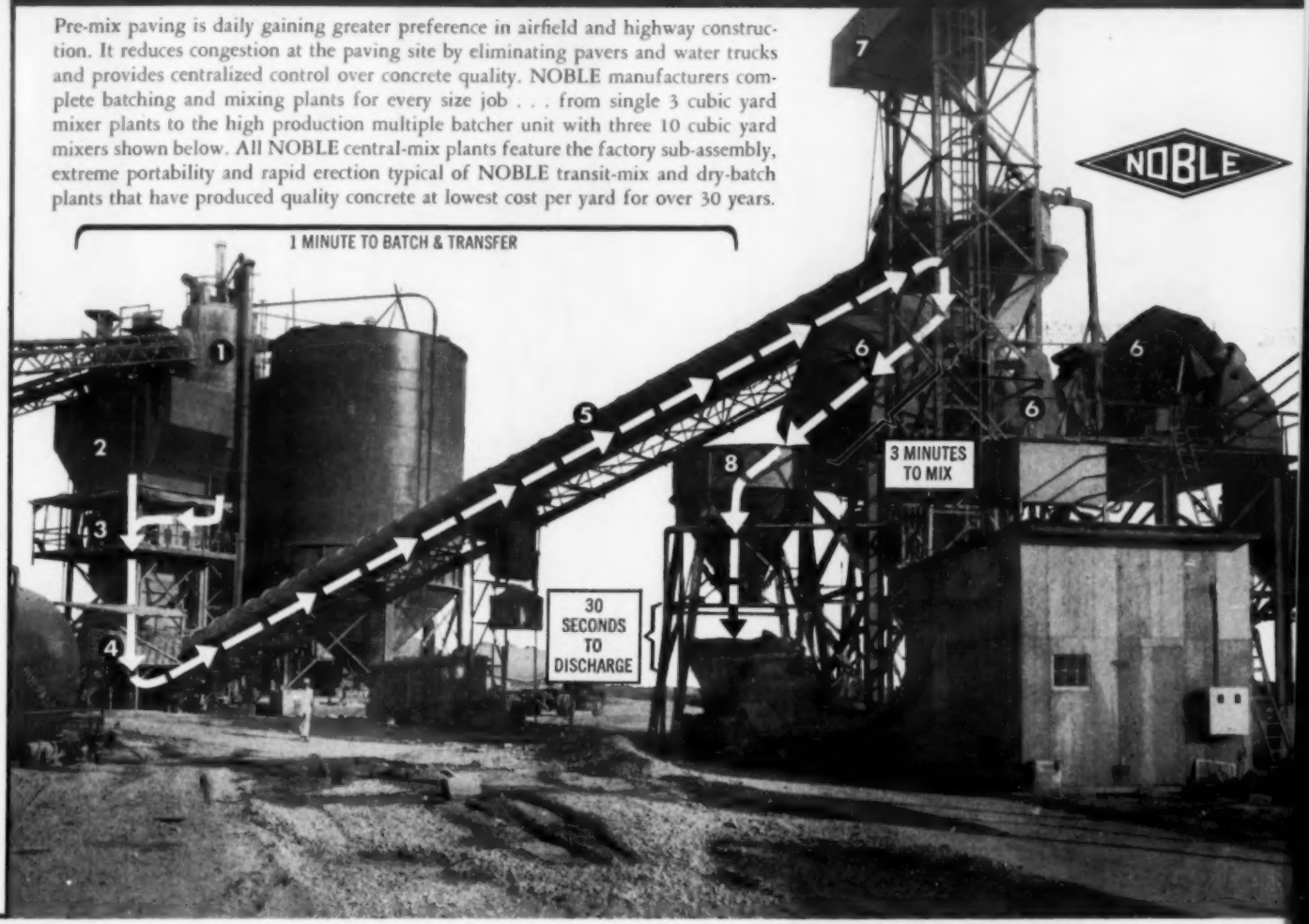
NOBLE CENTRAL-MIX BATCHING PLANTS SPEED HIGHWAY & AIRPORT PAVING

500,000 cubic yards of concrete for the $19,000,000 Chantilly International Airport, Washington, D. C., runway and taxiway construction represents the first paving job of this magnitude supplied from a central-mix concrete batching plant: C. J. Langenfelder & Son, general contractor. Producing 30 cubic yards of pre-mix concrete in 4½ minute cycles, this particular NOBLE central-mix plant features:

1. 600 barrel cement batching silo charged pneumatically. Overflow to two 7500 barrel storage silos. Cement recirculated from storage to batching silo by two 12" vertical screws.
2. 200 tons of rock and sand stored in 3 separate compartments charged by three 30" x 155 ft. NOBLE belt conveyors.
3. 5 automatic batchers in center section sub-assembly (3 for aggregates, 2 for cement) weigh materials simultaneously and accurately for a complete 10 yard batch. Push-button controls for batching and discharging into holding hopper. Automatic interlocks prevent batching to holding hopper with gates open. Extreme accuracy is assured by photo-electric "over-under" indicators of NOBLE beam scales and positive cut-off by automatic louvre gates on two high-speed cement feed screws.
4. Pre-blending of sand, aggregates, cement helps reduce subsequent mixing time to only 3 minutes.
5. 60" wide, 250 hp batch transfer conveyor alternately charges . . .
6. three 10 cubic yard Smith tilting mixers.
7. Water batching and distribution of dry materials from conveyor to proper mixer is controlled from tower. Water pumped up to scale from ground storage.
8. Three 20 cubic yard wet-mix holding hoppers provide 60 cubic yard reserve to avoid any delay in charging Dumpcretes. 3 Dumpcretes can be charged simultaneously on 3 separate driveways.

Three drive-over truck hoppers for two aggregates and sand. Emergency stocks of aggregates and sand for front end loading to truck hoppers.

Pre-mix paving is daily gaining greater preference in airfield and highway construction. It reduces congestion at the paving site by eliminating pavers and water trucks and provides centralized control over concrete quality. NOBLE manufacturers complete batching and mixing plants for every size job . . . from single 3 cubic yard mixer plants to the high production multiple batcher unit with three 10 cubic yard mixers shown below. All NOBLE central-mix plants feature the factory sub-assembly, extreme portability and rapid erection typical of NOBLE transit-mix and dry-batch plants that have produced quality concrete at lowest cost per yard for over 30 years.



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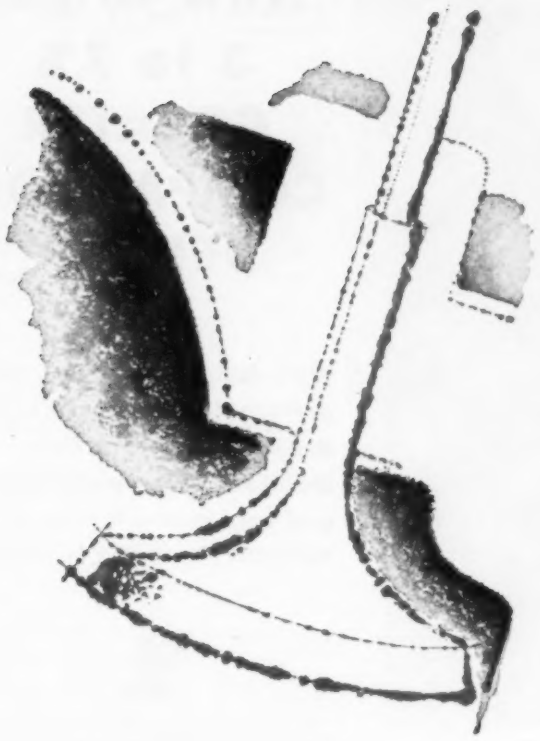

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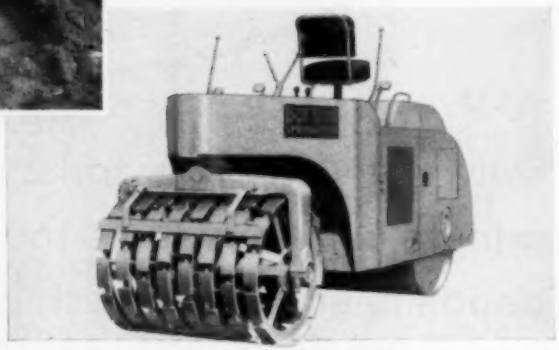

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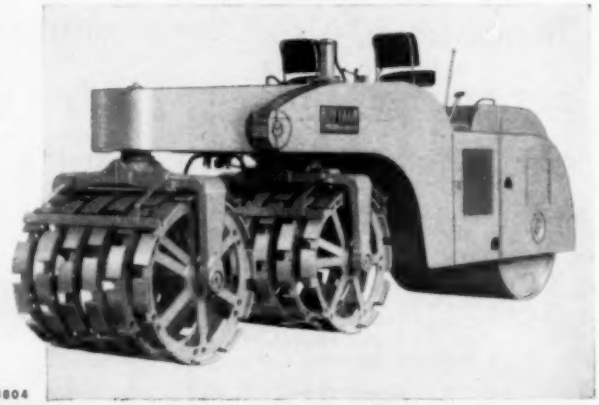

Quickly interchangeable . . . readily added to B-S-R rollers now working in the field.

Combining the best compaction benefits of both the projecting lug-type roller, and smooth-faced roll, Buffalo-Springfield 2 and 3-axle tandems offer you a unique method for faster, better compaction on a wide range of materials. Optional segmented roll, mounted in guide-roll position, applies pressure in a flat foot-print pattern . . . and is followed by smooth drive-roll pressure, *all in a single pass.* Result: job-performance tests show 3 to 7% greater compaction densities, as compared with conventional rolling methods.

Segmented roll is faced with staggered rows of heavy steel pads, which operate on an *"interrupted pressure"* principle of compaction. The pads individually enter loose materials with a minimum of displacement sideways or forward . . . then leave the material without disturbing compacted areas. All compaction effort is exerted in a *downward direction.* Segmented roll is, of course, readily interchanged, as your work requires. This is a real time-and-money-saving opportunity worth looking into! Better call your Buffalo-Springfield distributor about this right away.

9804

BUFFALO-SPRINGFIELD COMPANY

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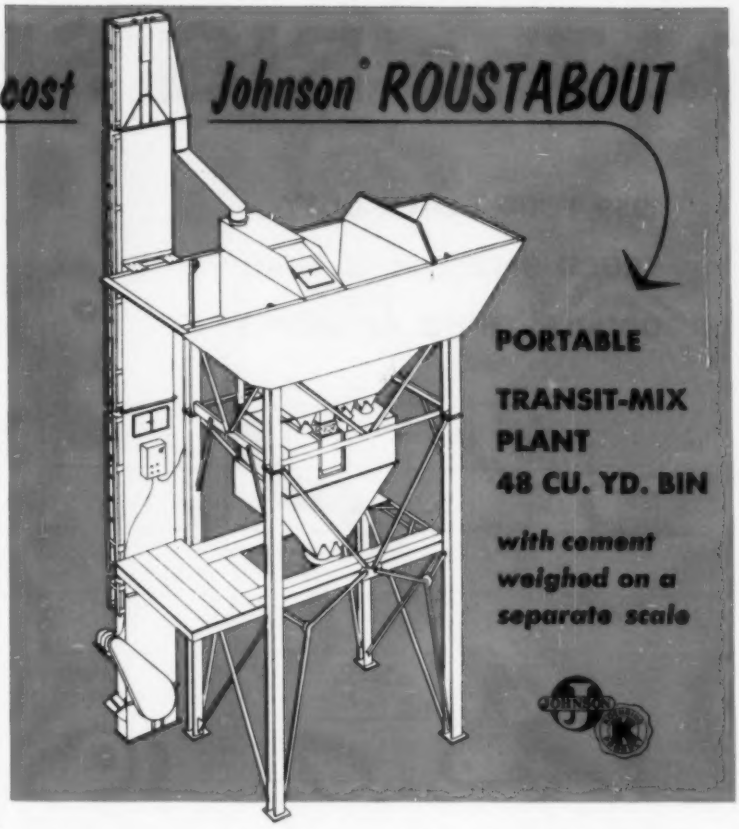
Meet the NEW...low-cost Johnson® ROUSTABOUT

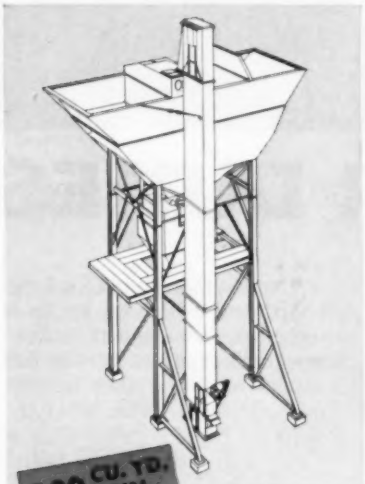


Latest development in a completely new series of low-priced transit-mix plants, this Johnson *Roustabout* is as portable and rugged as its name implies! Everything about it is designed for quick, easy assembly, and convenient truck transport between jobs. Maximum width of largest plant section is only 9 feet — maximum erection lift, only 4½ tons. Plant is set up, ready to work in less than a day's time!

Handles 4 materials — All-welded, 48 cu. yd. bin has 3 aggregate compartments (with total heaped capacity of 38 cu. yds.) — and a 60-bbl. cement compartment. Built-in, ¾ h.p. air compressor aerates cement through built-in fittings and plug-in connections. 180-bbl.-an-hour cement bucket elevator has 3 h.p. gearmotor with roller chain drive, and boot hopper for bulk or bag cement. Electric control panel is included, with plug-in connections to all plant motors.

Meets rigid specifications — One of the big *plus* values of this Johnson *Roustabout* is *separate weighing of cement* — complies with the most exacting mix specifications on paving and structural concrete jobs. A 3 cu. yd. Concentric aggregate-cement batcher, usually found only in larger more expensive Johnson plants, is *standard equipment* in the low-price *Roustabout.* It's manually-operated — and weighs the cement on an *independent* scale, separate from aggregates. Centrally located, sealed hopper discharges cement *within* the aggregates. This minimizes dusting, and *pre-mixes* all materials as they flow through discharge.

Roustabout is well-suited for clamshell charging — has large aggregate bin openings. Charging height is only 30½ feet. It also can be equipped with belt conveyor or bucket elevator for aggregates — and auxiliary storage silo with undertrack screw conveyor system for cement. Other optional accessories: bin signals, water meter, special hoppers, etc. Better see your Johnson distributor about the *Roustabout* right away — or mail coupon.



JUMBO

Largest in new Johnson series of low-cost packaged transit-mix plants, the Jumbo has bin storage for 3 aggregates (105 cu. yds. tot. agg. cap.) and 110 bbls. cement. 3-yd. or 6-yd. Concentric batcher.

ECONOPLANT™

Rounding out this special, low-priced transit-mix line, Johnson *Econoplant* handles 3 aggregates (tot. 45 cu. yds.) plus 70 bbls. cement — has all-welded bin, low 30½ ft. charging height, 3-yd. Concentric batcher.

Mail to: C. S. JOHNSON CO., Champaign, Ill.
Send us details on: ☐ Roustabout ☐ Econoplant ☐ Jumbo

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C. S. JOHNSON CO., CHAMPAIGN, ILL. • STOCKTON, CALIF. (Koehring Subsidiary)

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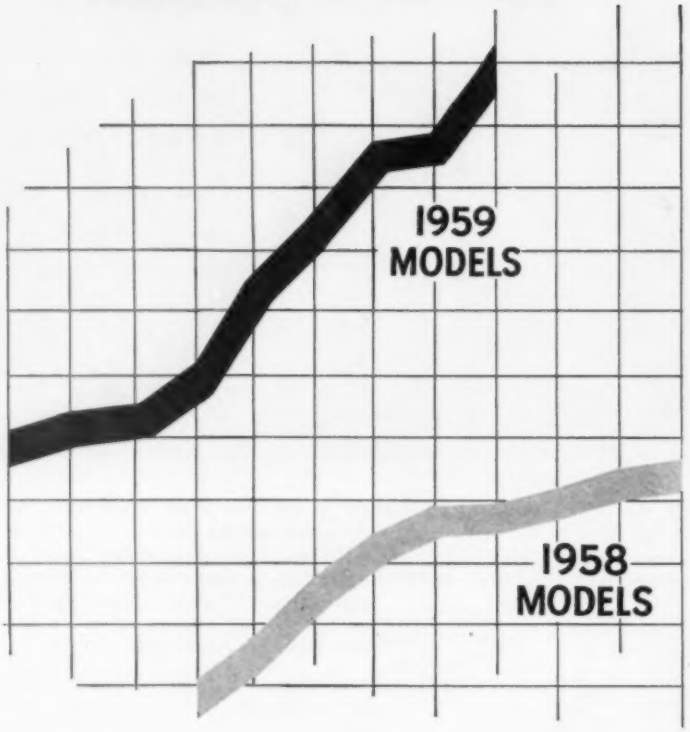
The BIG SUCCESS

1959 FORD SUPER DUTY TRUCK SALES MORE THAN DOUBLE THOSE OF LAST YEAR



1960 FORD SUPER DUTIES

SKYROCKETING SALES OFFER ADDED TESTIMONY TO THE TOUGHNESS AND RELIABILITY OF FORD "BIG V'S"— *NOW* THEY'RE MORE DURABLE, MORE FLEXIBLE THAN EVER!

Ford's increase in sales of Super Duty Trucks, while impressive in itself, by no means tells the whole story. Over half of the 1959 unit sales were the result of repeat orders from operators like Trucking Contractors, Inc., who bought because the Ford "Big V" provided the kind of performance and durability needed for their work.

And for 1960, the Ford Super Duties offer additional refinements designed to provide an even greater degree of dependability. Bigger optional axles and increased GVW's permit greater payloads and more profitable operation. Automatic radiator shutters to keep the engine temperatures within the most efficient operating range, submerged-type electric fuel pump to prevent vapor lock, and redesigned wiring for longer, more dependable operation are but a few of the improvements which add to the performance and durability of these units.

The changes offered for 1960 were tested and evaluated by America's foremost independent automotive research organization. The certified results of the studies by this impartial firm (name available on request) provide proof that Ford's Super Duty Trucks are even more dependable.

- **Certified Durability through closer temperature control!** Independent research engineers certify that Ford's thermostatically controlled radiator shutters kept water temperature between 168° and 188° in severe mountain grade operation. The test truck with shutters blocked open

of the Big Truck Field

"Tried 8 in '58—bought 20 more in 1959," says Curtis E. Brost, President, Trucking Contractors, Inc. "In 1958 we bought 8 Ford T-850's with lightweight chassis options and specially built 5-batch bodies which gave us a full extra batch per truck. A 5-batch load is a real strain on the truck when you consider we're 'running the ditches' on this highway paving job in North Dakota. These T-850's worked out so well that we ordered 20 more in '59. Our Ford Tandems with the 477 engine give us good mileage and the drivers are real happy with them. It's a rough go on trucks with soft footing and dust so bad we have to drive with headlights on. Despite such operating conditions, downtime has been negligible and these '477' Fords have given us less trouble than other trucks we have operated."

with Certified Durability

under same operating conditions had a temperature range from 102° to 181°. The temperature variation of only 20° with shutters means less expansion and contraction in engine block and cylinder heads. Higher temperatures with radiator shutters permit leaner fuel-air mixtures with less possibility of raw gas washing down cylinder walls. Warm oil circulates more freely, reducing internal friction. All these factors contribute to longer engine life.

- **Certified Dependability with longer-lived electrical system!** Ford's '60 improved wiring harness and the 1959 wiring harness were subjected to shaker table tests plus constant exposure to oil and water vapors and temperatures of 200°. Certified results prove that the greater resistance to deterioration by heat, oil, water and abrasion obtained with the 1960 wiring harness more than doubles wiring harness life.

- **Certified Reliability with Ford's submerged-type electric fuel pump!** Dynamometer tests of engines with submerged-type electric fuel pump and conventional mechanical type showed that vapor lock was non-existent with Ford's electric pumps at temperatures up to 200°, whereas incipient vapor lock with mechanical pump resulted in a power loss of 9% at an underhood temperature of 200°.

Test results like these plus the experience of satisfied users are important but that is not all. For 1960, the Super Duty line has been broadened to provide even more flexibility in power train options. Get the facts from your Ford Dealer!

FORD TRUCKS COST LESS

LESS TO OWN . . . LESS TO RUN . . . BUILT TO LAST LONGER, TOO!

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"We drilled over 5,000 ft., averaging 15 redresses per bit, with Timken® carbide insert bits"

Special report from Rogers Construction Company

LOCATION: U. S. HWY. 30, THE DALLES, OREGON

Operating conditions: Lava-Basalt

In converting part of U. S. 30 from a two-lane to a four-lane highway, Rogers Construction Co. of Portland, Ore., had to drill through Lava-Basalt. Holes in this very fryable rock varied from 25 to 60 feet. And for drilling on this very abrasive ground, Timken® carbide insert bits were a "natural". They set records. Some of the original 010 4½" bits have drilled well over 5,000 ft., averaging 15 redresses per bit.

Which Timken Bit should you use?

In hard, abrasive ground, the Timken carbide insert bit gives you greatest economy. But in softer ground, use the low-cost Timken all steel multi-use bit. Both bits are interchangeable in the same thread series; you can switch bits as the ground changes. What's more, dozens of different Timken bits fit the same drill steel. And both types are made from Timken electric furnace fine alloy steel, have special shoulder unions to protect against drilling impact. Let us help you select the right Timken bit for your job. Call or write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

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ROADS AND STREETS
Sixty-Six Years of Editorial Leadership

Washington News Letter

Exclusive - By Duane L. Cronk, Director, Highway Information Services

October 10, 1959

In brief, and for the record, the new Federal-Aid Highway Act provides an apportionment of $1.8 billion this year and $2 billion next year to continue work on the Interstate System. This money will be matched, as heretofore, 90-10. Also $925 million this year for the ABC Systems.

(Although Congress cut the Interstate System down from the previously approved $2.5 billion, it held the line on the ABC funds and thus the total federal-aid program authorized with matching funds, would be about $3.8 billion for the 1960-61 biennium.)

The Congressmen decided to boost the federal gasoline tax by 1¢ to replenish the Highway Trust Fund during the next 21 months. After that, amounts equivalent to 5% of the excise tax on automobiles, parts and accessories will be diverted from the general fund to the Trust Fund each year for three years. These new revenues are expected to produce an additional $3.5 billion for the roadbuilding fund, increasing the total flow into this federal-aid reservoir to nearly $14.8 billion.

* * *

The good news of Congressional action on the Federal-Aid Highway Act of 1959 was no sooner out than a dismaying development came to light. Under questioning by the Senate Finance Committee the day before the bill was brought onto the Senate floor, Federal Highway Administrator Bertram Tallamy announced that the administration has definite plans to hold down contract awards in every state this year.

The problem is that the Highway Trust Fund, even with the new tax boost, is running into a critical period during which it cannot reimburse state highway departments if they obligate all of their apportionments authorized by Congress in the 1956, 1958, and now the 1959 Acts. The rapid rate at which the states are purchasing right-of-way and letting contracts will create a drain on the Trust Fund in excess of its assets.

Legally, the states can go ahead and obligate their full share of these funds, and the U.S. Treasury must reimburse them on a "first-come, first-served" basis - till the money runs out, that is. The BPR feels this would be too inequitable and that a better idea would be to ration each state at the contract-awarding stage and thus prevent a "run" on the bank.

Best guess now is that (1) Interstate contract obligations will be held to a level of $1.8 billion during this fiscal year ending next June 30; and (2) each state's position in the so-called "needs" formula will determine how much it will

(continued on next page)

be permitted to obligate for Interstate contracts, right-of-way and preliminary engineering. Details are expected to be revealed at the AASHO convention in Boston this month.

* * *

What will this do to contract obligations? Last fiscal year (ending June 30, 1959), the states obligated more than $2.5 billion for Interstate work (federal plus state matching funds). Of this sum, about 75% was for actual construction. The remainder went into right-of-way purchases and preliminary engineering. If the same proportion prevails this year, the contractors' chunk of the $1.8 billion federal kitty (plus $200 million state matching) will be about $1.5 billion. This is a drop nationally of 19%. ABC System contract obligations (exclusive of the "emergency" funds) came to nearly $1.7 billion last year. They are expected to be about the same this year - unaffected by the Interstate cut-back.

The state-by-state picture will vary drastically, of course. States which have been out front and have hit a fast pace of awarding will be slowed down. Others which have been overly long in gearing up and are just now reaching the point of letting contracts in any volume will not be able to catch up.

* * *

Senator Albert Gore has blasted the whole scheme in a long letter to President Eisenhower. It is no sage observation that probably every state which will suffer a cut-back under the control plan will have its Congressman citing chapter and book from the federal law. Some states have quite a backlog of unobligated funds to their credit. They won't like the idea of not being able to use them. As Senator Gore pointed out, the right of state highway departments to proceed with contract lettings upon apportionment of federal funds has been a historic process. He saw the imposition of a governor at the awarding stage "a serious attempt to infringe upon states' rights."

It is highly unlikely that Congressional complaints will have much effect on the Administration. The President is determined that no deficit in the highway program can be laid at his door. The Administration has already demonstrated, on other programs, its ability to put a damper on expenditures, even if Congress has called for more. There are a dozen ways to slow down the program if the Administration desires.

* * *

As if the lack of federal money were not enough to worry the roadbuilding industry, last month saw repeated calls in Congress for investigation of the whole National Highway Program. In every House and Senate committee involved, and on the floors of both chambers, legislators demanded an investigation into the multi-billion-dollar internal improvement program. Heated charges of extravagance, waste, and disregard of local sentiments forced the House leadership to appoint a special committee to conduct an inquiry.

The committee convened at once and promised a thorough airing of the federal-aid undertaking. Its early actions indicate it will unearth and expose any "scandal" it can dig up. Professional investigators from Bob Kennedy's Senate "Rackets" Committee have been retained, as well as a publicist whose job it will be to keep the investigation in the headlines. Congressman Blatnik of Minnesota, chairman of the group, told Highway Information Services that they will pry into contract awarding procedures, right-of-way purchasing, and design practices.

We have heard charges of collusion, favoritism, and extravagant design. We're going to track them down," he said.

* * *

The BPR has already been singled out for criticism by the Government Accounting Office, at the request of Congress several weeks ago. Among other things, the GAO charged . . . that construction on the ABC System should be more rigidly controlled by the Bureau . . . that consultants for state highway departments are receiving exorbitant fees for design work . . . that disclosure of engineers' estimates to contractors (in six states) is restricting competition and influencing bids . . . that state contract-awarding procedures are so divergent as to arouse suspicion. . . . that lack of uniform "maximum" design standards for Interstate roads is inviting excessive designs and costs . . . that some state right-of-way procedures are questionable.

Industry observers here expect that the efficient investigators about to start their sleuthing into the road program will make the GAO report their launching pad.

Meanwhile, the roadbuilding industry is not going to sit idle, waiting the blow to fall. A new committee, appointed by contractor Nello Teer, Jr., president of the American Road Builders Association, met last month to consider an ambitious program to educate the public on highway matters. Chairman J. T. Callaway, assistant to the vice president of Goodyear Tire and Rubber Co., reported that the group feels that lack of public support was largely responsible for the reluctance of Congress to draft a bold financing measure this summer. He saw even tougher days ahead. There's a threat of an exposé of the road program, and prospect of a "knock-down, drag-out" fight between truckers and motorists when the controversial AASHO Test Road results come. The result may be to confuse both Congress and the public.

ARBA wants to over-ride any possible public prejudices with a dramatization of the benefits of modern highways. The steering committee which organized in Washington last month is composed of top PR men from some of the largest companies in the roadbuilding industry - contractors, equipment manufacturers, materials producers, publishers and association executives. Some have carried on institutional advertising programs for the "good roads" cause for years.

* * *

Some of the on-the-job problems confronting contractors were aired at the Mid-year Board Meeting of the Association General Contractors of America last month. Association officials are concerned about mounting red tape in federal-aid work, and labor restrictions on Interstate projects. Three other specific issues stirred discussions:

- Owner-operators of trucks and construction equipment are "employees," the Department of Labor has ruled and, hence, must be reported on payroll forms. AGC contractors disagree vigorously. (See full report in next issue of Roads and Streets.)

- Lax enforcement of the 50% limitation on subcontracting on federal-aid jobs has contractors upset, too. A BPR crack-down is in prospect, the meeting was told.

- Contractors were urged to begin at once taking a more active hand in fostering public support of the road program. Get on chamber of commerce committees, tie in with good roads associations, were among the "grass roots" suggestions.

(continued on next page)

HOW THE STATES MIGHT FARE UNDER CONTRACT CONTROLS

The U.S. Bureau of Public Roads is considering a number of ways by which Interstate obligations can be held to a level of $1.8 billion during fiscal year 1960 and permit an equitable participation of all the state highway departments in the funds available. The thinking now is that each state will share on the "needs" formula basis. That is, if the cost to complete a state's Interstate segments is 5% of the total estimated cost of the entire network, that state will be permitted to obligate up to 5% of the $1.8 billion ceiling the Administration has established.

This proposal has not yet been officially decided, and some modifications may well be adopted within the next few days. Here is a comparison between what each state obligated during fiscal 1959 for Interstate work by construction, right-of-way, and preliminary engineering; and the amount which would be permitted under this proposed system. Sums are in millions of dollars. Actual construction contracts will amount to about 75% of the total nationally.

State	Obligated in Fiscal 1959	May Obligate in 1960	State	Obligated in Fiscal 1959	May Obligate in 1960
Alabama	$ 50.48	$ 35.5	Nevada	$ 20.20	$ 9.5
Alaska	-	-	New Hampshire	23.53	9.9
Arizona	24.94	24.6	New Jersey	42.48	58.3
Arkansas	22.60	18.0	New Mexico	22.73	21.6
California	145.20	182.9	New York	140.99	89.1
Colorado	26.51	14.0	North Carolina	27.87	9.8
Connecticut	28.81	22.0	North Dakota	22.32	8.1
Delaware	4.89	6.3	Ohio	161.59	117.3
Florida	74.66	46.7	Oklahoma	21.41	16.4
Georgia	45.51	43.5	Oregon	42.15	31.3
Idaho	17.84	12.5	Pennsylvania	66.52	73.4
Illinois	113.51	92.3	Rhode Island	5.14	8.4
Indiana	69.28	52.0	South Carolina	33.72	14.9
Iowa	60.30	17.1	South Dakota	17.74	7.7
Kansas	24.62	16.2	Tennessee	58.34	53.4
Kentucky	61.02	31.7	Texas	125.32	81.3
Louisiana	59.78	47.6	Utah	29.46	16.9
Maine	19.13	9.3	Vermont	13.06	17.1
Maryland	9.53	40.6	Virginia	35.60	76.3
Massachusetts	71.00	50.2	Washington	37.58	32.6
Michigan	108.89	70.8	West Virginia	45.08	22.6
Minnesota	46.83	34.0	Wisconsin	42.75	19.0
Mississippi	24.95	19.8	Wyoming	21.78	18.8
Missouri	51.82	51.4	Hawaii	-	-
Montana	19.77	20.5	Dist.of Col.	5.86	17.9
Nebraska	16.21	11.1	Puerto Rico	-	-
			TOTAL	$2,261.30	$1,800.0

NOTE: These are federal funds only. The table does not include ABC funds of which, the BPR believes, the full $925 million will be available, to be matched 50-50 by the states.

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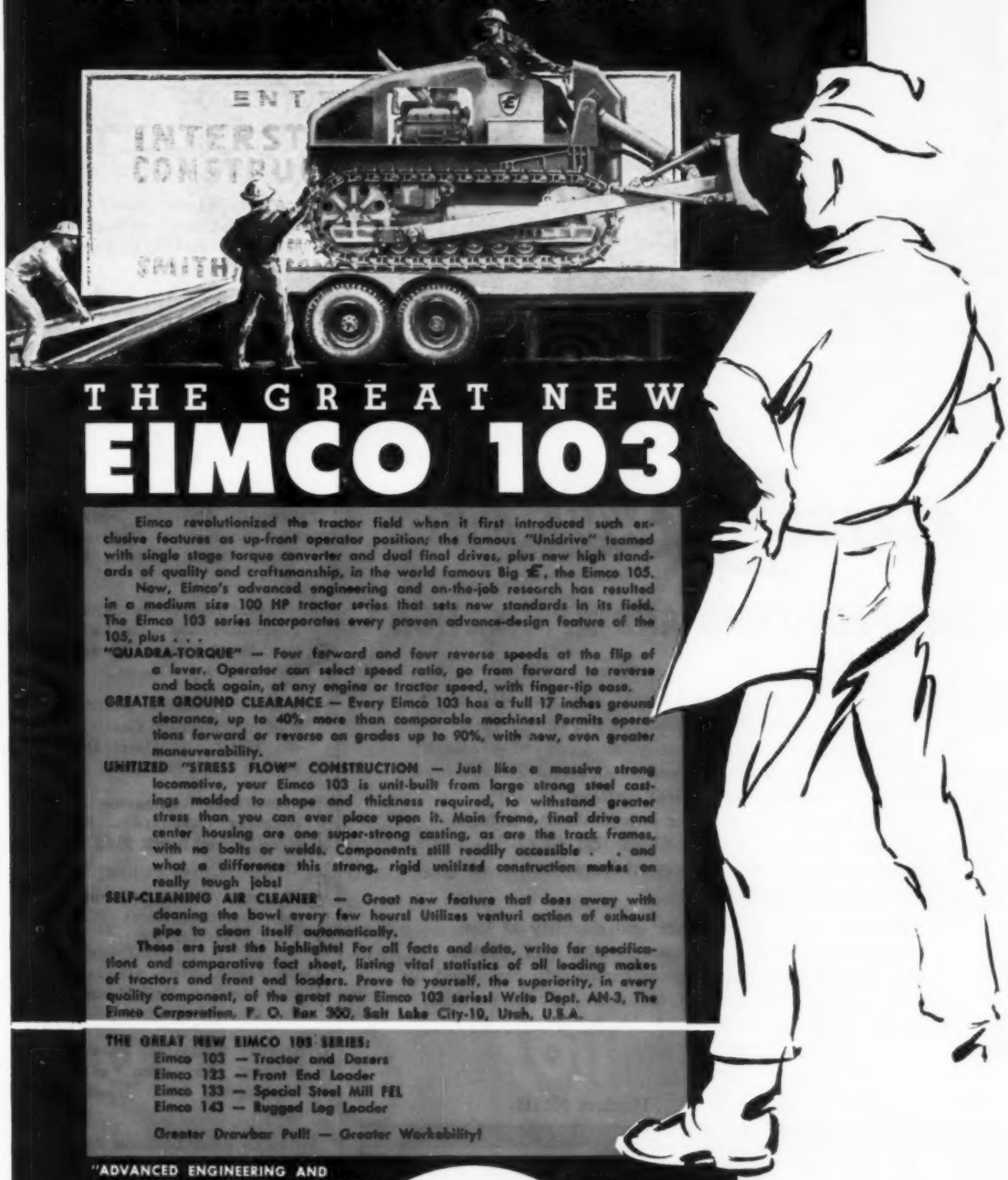

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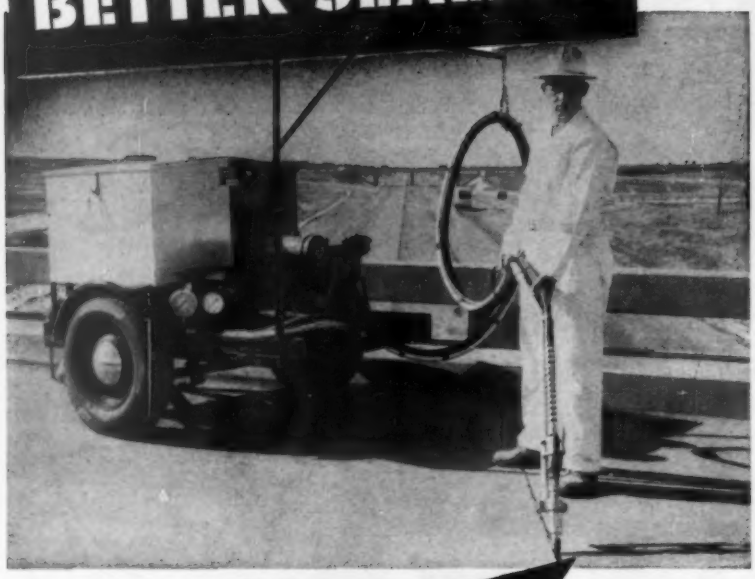

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Meetings

AMERICAN BRIDGE TUNNEL AND TURNPIKE ASSOCIATION—Annual meeting, Hotel Muehlebach, Kansas City, Mo.; October 19-22.

AMERICAN SOCIETY OF CIVIL ENGINEERS—National Convention, Statler Hotel, Washington, D.C.; October 19-23.

NATIONAL SAFETY CONGRESS AND EXPOSITION—Conrad Hilton, Congress and other Hotels, Chicago, Illinois—October 19-23.

AMERICAN ROAD BUILDERS ASSOCIATION—7th Annual National Highway Conference for County Engineers and Officials, Hotel Leamington, Minneapolis, Minn.; October 26-28.

NATIONAL SLAG ASSOCIATION—Annual Meeting, Boca Raton Hotel and Club, Boca Raton, Fla.; October 29 and 30.

PRESTRESSED CONCRETE INSTITUTE—Annual Convention, Deauville Hotel, Miami Beach, Florida; November 1-7.

ASSOCIATED INDEPENDENT REBUILDERS & PARTS SUPPLIERS—Annual Convention, Hotel Roanoke, Roanoke, Va.; November 2-3.

AMERICAN CONCRETE INSTITUTE—12th Regional Meeting, Continental Hilton Hotel and Hotel Del Prado, Mexico City; November 3-5.

SOUTHEASTERN ASSOCIATION OF STATE HIGHWAY OFFICIALS — Eden Roc Hotel, Miami Beach, Fla.; November 23-25.

THE ASPHALT INSTITUTE—Annual Meeting, Shoreham Hotel, Washington, D.C.; December 2-3.

OHIO CONTRACTORS ASSOCIATION—Annual Meeting, Neil House, Columbus, Ohio; December 7-8.

HIGHWAY RESEARCH BOARD—Annual Meeting, Sheraton-Park Hotel, Washington, D.C.; January 11-15, 1960.

AMERICAN ROAD BUILDERS ASSOCIATION—Annual Convention, Cincinnati, Ohio; January 18-21, 1960.

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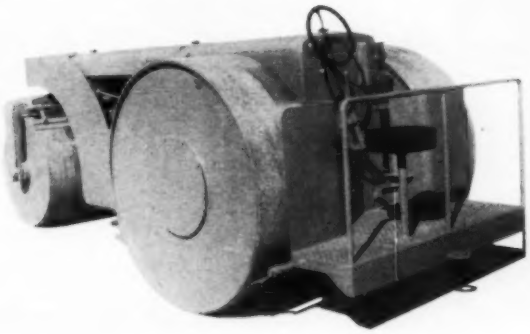

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In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

. . . for more details circle 300 on enclosed return postal card

The Cover Scene

The front cover this month shows a shovel operation on New Jersey's largest-yet state highway grading job. As described in a feature article in August Roads and Streets, the work by Yonkers Contracting Company is requiring 1,500,000 cubic yards of excavation, some 75 percent rock. The project is for a relocation of US 22 as an Interstate highway east of Phillipsburg.

The significant feature of the contractor's strategy is his use of "plenty equipment," particularly shovel and hauler capacity. Along with a Northwest 80D shovel, the shovel here pictured (a Bucyrus-Erie 88-B with 5-yd. dipper) got the job rolling, and another 88-B was added to make it a real production show. A pace of 15,000 cu. yd. per day of rock was maintained using 15 International Payhaulers and 10 Euclid rear-dumps.

New Metal Promises Tougher Tractor Tracks

A metallurgical breakthrough promises longer life to crawler tractor track components.

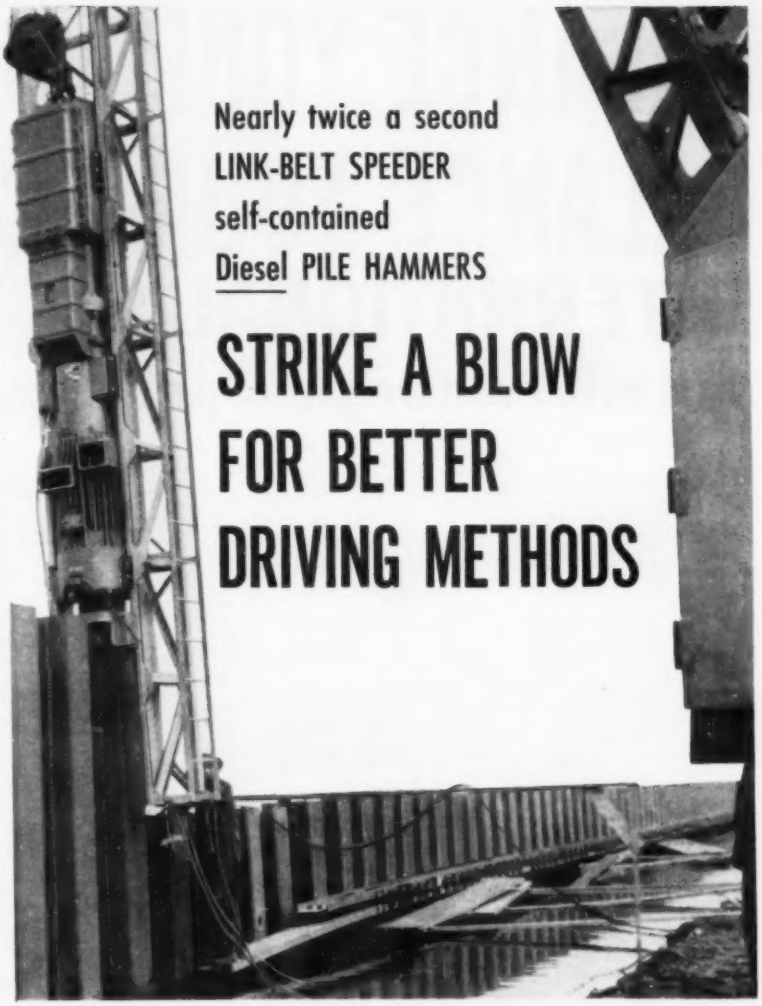
So states caterpillar Tractor Co., which recently revealed a new metal having the ability to be hardened to twice the depth of previous materials. This metal is now used in making track links, shoes, and rollers installed on Cat D8 and D9 Tractors.

The new deep-hardenable steel—a product of Caterpillar metals research—allows heat treatment to harden the metal to approximately ¼ in. depth, as compared to only about ⅛ in. in previous steel. This, the company stated, will lead to an increase in wear-life of these parts of up to 40 percent. The development provides the advantages of both deeper hardening *and* high internal strength.

The new metal is used throughout the track link and track shoe, and in the roller rim. All three parts are offered as standard or replacement parts, at no increase in price.

In the track link, the new steel not only increases rail life, but also holds the track pin in position more effectively, and is more resistant to "pounding out" from pin and bushing action.

Appointment of H. William Marquardt as Export Manager for the National Electric Division, H. K. Porter Company, Inc.



Nearly twice a second
LINK-BELT SPEEDER
self-contained
Diesel PILE HAMMERS

STRIKE A BLOW FOR BETTER DRIVING METHODS

Tri-Power cycles...keep the pile in motion longer

Tri-Power cycles — pile *preloading*, high *impact* and two-way *explosion* — keep the pile in motion *longer!* Result: you can forget about brooming, spalling, flanging of piling, count on extra-profitable hours of actual pile driving time.

One-Man Operation

More savings! Just one man controls both hammer and crane from the cab.

Hammers up to 7,500, 18,000 and 30,000 ft. lbs. per blow. Easy setup. Simply put hammer in leads. Hook up throttle control. No struggle with clumsy compressors, boilers, auxiliaries. And add these:

104-59N

• **Exclusive** enclosed head acts as "air spring" — short stroke, fast ram return, more blows per minute means more piling driven. *No* dirt fouling.

• High-pressure fuel injection system and exclusive "glow plug" provides easier starting in cold weather and in soft ground.

• Choice of driving heads.

Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

Ask your Link-Belt Speeder Distributor for free Diesel Pile Hammer Bulletin No. 2582-A.

LINK-BELT SPEEDER

Also builders of a complete line of shovel-cranes . . . ½ to 3-yd., 8 to 75-ton capacities.
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BALANCE YOUR LOAD...
BALANCE YOUR SCHEDULES!
INTERNATIONAL SIX-WHEELERS
do it with even weight distribution, step-ahead power

Compact-design six-cylinder or V-8 INTERNATIONAL models give you the most advanced combination of engine and semi-automatic transmission in the business. There's perfect unit-to-job balance hilly country or flat. Husky, all-truck power to 345 cu. in. has the guts to pull out of a "hole" or pull ahead on the road. Select-O-Matic transmission (optional) tames every ounce of power for complete control and smooth application whatever the conditions. Shock-load to rear axle is virtually eliminated. Six-wheel models to 33,000 lbs. GVW.

When only a six-wheeler can do the job right, only INTERNATIONAL offers 84 ways to go!

INTERNATIONAL® TRUCKS WORLD'S MOST COMPLETE LINE

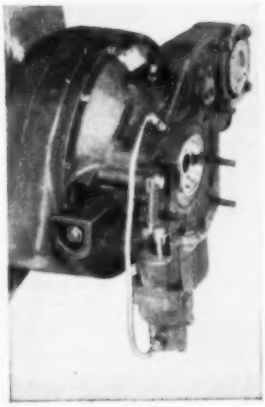
International Harvester Co., Chicago • Motor Trucks • Crawler Tractors • Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

Dependable! From reinforced cabs to extra-husky frames, V-8 powered INTERNATIONAL six-wheel trucks are quality built for fast-moving dependability. Rugged power trains including up to 549 cu. in. V-8 engines and standard differential lock-out are factory matched for heavy-duty use. Special truck pistons and rings cut oil consumption. Metered-flow water jacket evens engine temperature. Finish-honed replaceable exhaust valve guides and self-aligning hydraulic tappets further reduce nominal downtime. COE and conventional models to 65,000 lbs. GCW.

Tough! Rugged, six-wheel INTERNATIONAL transit-mix chassis are available with six-cylinder engine options offering up to 501 cu. in. displacement. Every pound-foot of engine torque is multiplied by an over-all gear reduction of over 100-to-1. The powerful result is dependable, smooth-working tandem performance that keeps heavy-duty payloads moving on schedule—cuts cost with reduced operating expense and downtime. 34,000 lb. tandems, 15,000 lb. front axles. Optional power steering—diesel engines to 175 hp.

Now increase payloads and working life with direct drive flywheel power take-off!

New INTERNATIONAL factory mounted option on heavy-duty "six" or V-8 engines eliminate power take-off at front end. Direct gear drive off flywheel gives you up to 75 hp. at output shaft. There are no belts to replace, no excessive parts to wear out . . . maintenance and downtime are kept to minimum.



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Precision Paves The Way

Skill, modern methods and experience count heavily in building the nation's fast-spreading network of super highways.

They also count heavily with THE FIDELITY AND CASUALTY COMPANY OF NEW YORK in providing contractors with . . .

—all types of bonds and bonding service that fit their needs

—carefully-patterned insurance and safety engineering service to give them the best in protection

F & C facilities blanket the country. You'll find an F & C agent in practically every town.

The Fidelity and Casualty Company of New York

"Writing Bonds Since 1876"

a member company of America Fore Loyalty Group

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Personals

RALPH L. HAGER is the new deputy highway commissioner in Connecticut, appointed by commissioner Howard S. Ives. Mr. Hager started with the highway department in May, 1928, and has risen through various administrative positions, more recently being assistant to the chief of staff services.

Ralph L. Hager

ROBERT G. MITCHELL has been appointed chief of planning, traffic and design, Connecticut state highway department, as a result of a merit system examination. He has been with the department for 27 years, serving recently as acting chief of planning, traffic and design.

W. R. GLIDDEN, bridge engineer and assistant chief engineer, and 43-year employee of the Virginia State Department of Highways, is retiring. Mr. Glidden has held many offices including the presidency of the American Society of Cicil Engineers.

J. T. HALLETT, long time career man in Indiana highway affairs, has retired from the state highway department. He was assistant to the chief engineer, and formerly for many years was engineer of roads. Mr. Hallett was for the past fourteen years a member of the advisory board of the joint highway research project of Purdue university.

ALAN C. CARTER has been appointed district engineer of Portland Cement Association at Salt Lake City, Utah. He succeeds Ralph E. Spears, who becomes regional structural engineer for the association's West Central region.

GALION ROLL-O-MATIC ROLLERS

*EXTRAneered for

EXTRA Performance
EXTRA Long Life
EXTRA Profits
EXTRA Easy Handling

* Extraneering is the implanting in Galion Rollers—through superior design, materials and workmanship—the ability to do better work, operate more economically, and last longer than other rollers.

Use the GALION ROLLER RENTAL PLAN.....

All Types—All Sizes—All New Models.

Money-saving rates—compare them. Rent for any period of time to suit your specific needs. See your GALION Distributor today.

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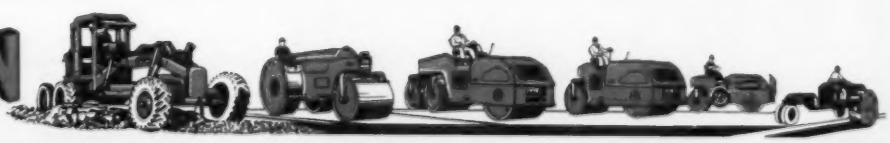

MOTOR GRADERS & ROLLERS

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New Publications

Alcoa Structural Handbook

One of American industry's "best sellers" is back on the presses: the "Alcoa Structural Handbook." Between 1930 and 1958, it had "sold" 188,500 copies. The new 6th edition will be 40,000 copies.

The book, published originally under the title, "Structural Aluminum," was a joint effort of Alcoa Research Laboratories and of the structural section of Aluminum Company of America's development division. The purpose was to supply design information on the use of aluminum in structures.

The book's data were extensively used by a committee of the American Society of Civil Engineers in preparing their aluminum specifications, first published in 1948. The Alcoa handbook has been the sole manual of its type throughout the three decades of its existence.

The new edition has grown to 420 pages, including 140 tables. As with earlier editions it is expected to be widely used as a reference in several hundred colleges and universities and in trade, vocational, and technical schools of all types.

The current revision involved changes in text, general up-dating of tables, and the addition of several new tables. Extensive data on the aluminum-magnesium alloys, and comprehensive coverage of welded structure design are included in the new handbook.

"Alcoa Structural Handbook" is available in limited quantity from Alcoa sales offices, or from 789 Alcoa Building, Pittsburgh 19, Pa.

Lime Stabilization Construction Manual

The American Roadbuilder's Association has issued a 36-page technical bulletin No. 243 under the above title. For copy address the Association at World Center Building, Washington 6, D. C.

The manual, the work of the ARBA Lime Stabilization Technical Committee, is the first detailed procedures manual on lime stabilization. It is based on a national survey made of many highway engineers and contractors experience with the new, growing method of road base construction.

Chapters are included on recommended procedures, detailed elaboration of construction steps, and miscellaneous considerations.

ELECTRIC UTILITY NON-USER BENEFITS From Oregon Highways, by H. T. Koplin and D. A. Watson. A report prepared for the Oregon State Highway Commission in cooperation with the Bureau of Public Roads, by the Bureau of Business Research, University of Oregon, at Eugene. Price: $1.00 on request.

Gravel Road Methods

Illinois has nearly 100,000 miles of gravel or crushed-stone roads, representing three-quarters of all its road mileage. The first comprehensive manual for building and maintaining such roads has been compiled by the University of Illinois.

This 146-page "Manual of Current Practice for Design, Construction and Maintenance of Soil-Aggregate Roads," covers materials, soils, construction, maintenance, design and testing. It was prepared by Prof. Eugene Y. Huang of the civil engineering department. The

Concrete mix would grind the markings off most tapes!

This is Lufkin's Mezurall® tape . . . with unmatched Chrome Clad® blade that fights concrete, sand, mud and other abrasives.

Lufkin starts with a special tempered steel . . . bonds the markings to it. Then layer after layer of electroplating is applied, topped by a final layer of tough chrome. There's no other blade like it. Comes in 6′, 8′, 10′ and 12′ lengths . . . either ½″ or ¾″ widths. The Lufkin Rule Company, Saginaw, Mich.

THE LUFKIN RULE COMPANY
TAPES • RULES • PRECISION TOOLS

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for even the most remote users of CHRYSLER POWERED equipment

PARTS & SERVICE within 8 hours

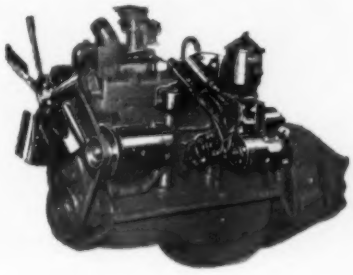
Costly down time has been virtually eliminated for users of Chrysler-powered equipment by the establishment of new Chrysler engine centers and the expansion of Chrysler's dealer network. There are now 40 strategically located engine centers, 350 dealers in the United States. Almost 400 service outlets.

Each engine center has a large and complete inventory of parts and replacement engines—with special delivery trucks operating throughout the area. Many even operate private airplanes for emergency service and parts delivery. Each engine center also has the service buildings, tools and trained engine specialists to provide service for all types of Chrysler-powered equipment.

This is the fastest, most efficient parts and service set-up in the industry. It is the best insurance you can get against costly down time losses. It is also one of the big reasons why, today, demand for Chrysler Industrial Engines is at an all time high.

NOW AVAILABLE FROM CHRYSLER—DIESEL ENGINES, 9 to 300 h.p. (16 models)

CHRYSLER-POWERED SCOOPMOBILE (above) owned by Falls Ready-Mix, Inc., Thompson Falls, Montana is working on a 949-foot steel and concrete bridge over the Clark Fork River. Even in this remote region Rex Denison, owner, is assured of Chrysler parts and service within 8 hours—virtually eliminating costly down time. Equally important, Mr. Denison says, "Chrysler engines give us efficient, trouble-free performance with plenty of reserve power."



CHRYSLER IND. 32 (265 cu. in. displacement). Other Chrysler models 230 to 354 cu. in. displacement.

CHRYSLER

MARINE AND INDUSTRIAL ENGINE DIVISION

CHRYSLER CORPORATION · DETROIT 31, MICHIGAN

. . . for more details circle 295 on enclosed return postal card

QUICK TO LOAD AND HIT THE ROAD

The Allis-Chalmers TS-160 has stepped ahead in the 7- to 10-yd class . . . for good reasons!

Exclusive double-acting bowl jacks. These jacks exert tremendous two-way power—down for fast penetration and big loads in all kinds of material—up for quick getaway. Double-acting pan control also lets operator clean up ditch, shine slopes, landscape and finish roads to blue-top specs.

Highest hp to struck capacity. The powerful Allis-Chalmers engine delivers up to 22 hp per struck yard. More than any of comparable size. That's why the TS-160 loads faster—gets out of the cut quicker with or without a pusher.

Highest rimpull. When it's power you need—in the cut, on haul roads, soft spots or on steep grades—the TS-160 gives you more than 19,300 lb of rimpull—from 17% to over 37% more than others in its class.

KON-TORK differential. When ground is soft or muddy, the KON-TORK differential constantly transfers power to the driving wheel with the best traction.

In addition, the TS-160— . . . turns non-stop in 24 ft, 8½ in. . . . with finger-tip, 90-degree steering . . . uses positive, forced ejection to doze all material through high, 85½-in. apron opening . . . distributes loaded weight equally

. . . move ahead with ALLIS-CHALMERS

TS-160 power, speed and exclusive advantages save you time in the cut, give you good getaway power, send you to the fill with a full load. Here's a unit that fits any fleet—can hold its own on production work and pays its way working solo on spot utility and cleanup. Here are the features—look 'em over carefully.

on all wheels for maximum flotation . . .rear wheels run *inside* the 97½-in.-wide cut.

Your Allis-Chalmers dealer has all the facts—see him before you add your next scraper. He'll be glad to show you why a TS-160 may be just what you've wanted to add flexibility to your fleet. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

KON-TORK is an Allis-Chalmers trademark

A-C ALLIS-CHALMERS

power for a growing world

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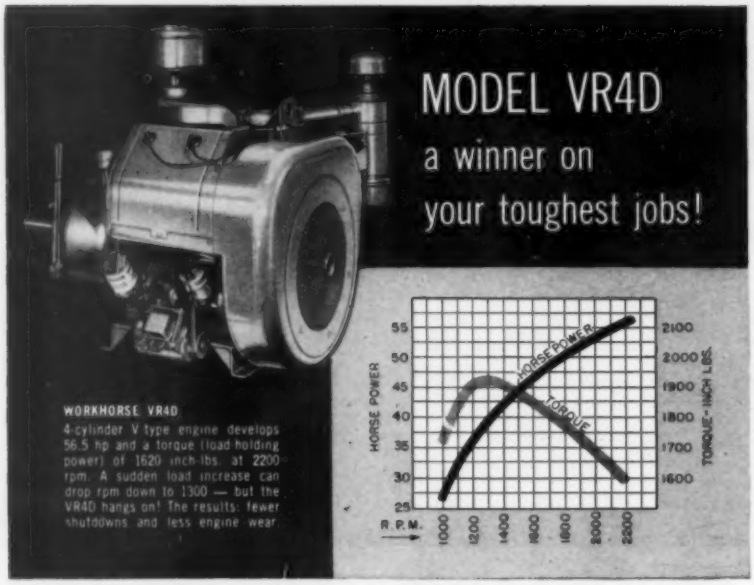
New Publications

recommendations are the outcome of an investigation sponsored by the University's engineering experiment station in cooperation with the Illinois state division of highways and U.S. Bureau of Roads. With this study of current practices completed, research now is being undertaken for possible improvements.

Copies are being distributed by the division of highways to its offices and to all county highway superintendents. Readers desiring a copy should write the University of Illinois, Public Information Office, Urbana, Illinois.

PROCEEDINGS, FIRST INTERNATIONAL SKID PREVENTION CONFERENCE. 600 pages including 59 papers. Available at $10.00 per copy from Virginia Council of Highway Investigation and Research, Box 3817, University Station, Charlottesville, Virginia.

this WISCONSIN engine
is a **Workhorse...**
not a race horse!



Here's 56.5 hard-working horsepower you can depend on for steady power at any pace! The Model VR4D breezes through normal power demands — works effortlessly at top speed. But most important, it has rugged load-holding power at slow speeds — to keep going under sudden shock loads that would most likely stall other engines with the same piston displacement.

You don't have to pamper the Model VR4D. It's built to resist the hardest shocks on the toughest construction jobs. Air cooling cuts engine weight and upkeep—assures fast starts and top efficiency in any weather, from sub-zero to 140°F. Stellite exhaust valves and valve seat inserts and positive-type valve rotators extend valve life by 200% to 500%. They resist corrosion and pitting—give better fuel economy.

Protect yourself — specify Wisconsin-powered equipment for the tough jobs ahead. You get workhorse stamina in *every* Wisconsin engine—single-, two-, or V-type four-cylinder models, from 3 to 56 hp. Write for Form S-230 on the VR-4D — or Bulletin S-237 describing the entire Wisconsin line.

WISCONSIN MOTOR CORPORATION
MILWAUKEE 46, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

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New Manual on Aluminum for Designers

Aluminum Construction Manual. The Aluminum Association, 420 Lexington Ave., New York 17, N.Y. 392 pp. 6 x 9. $3.00.

Provides in a single volume data which is essential to designers, engineers and architects concerned with stressed aluminum structures. The book presents for the first time computations of allowable loads for beams and columns of aluminum alloy 6061-T6, one of the most widely used aluminum structural alloys.

Contents are arranged for convenience in five parts:

(1) Available aluminum structural shapes; dimensions, weights and properties; standard tolerances, miscellaneous data necessary for designing and estimating.

(2) Detailing practice and data on riveted and bolted connections.

(3) Covers the hitherto unavailable material for beams and columns produced in alloy 6061-T6. The data for various types of laterally supported beams and concentric loads on columns were computed by the Polytechnic Institute of Brooklyn.

(4) Presents data on nine alloys which fulfill most structural needs. Found here are the specifications for structures of two commonly used alloys (6061-T6 and 2014-T6) as issued by the American Society of Civil Engineers.

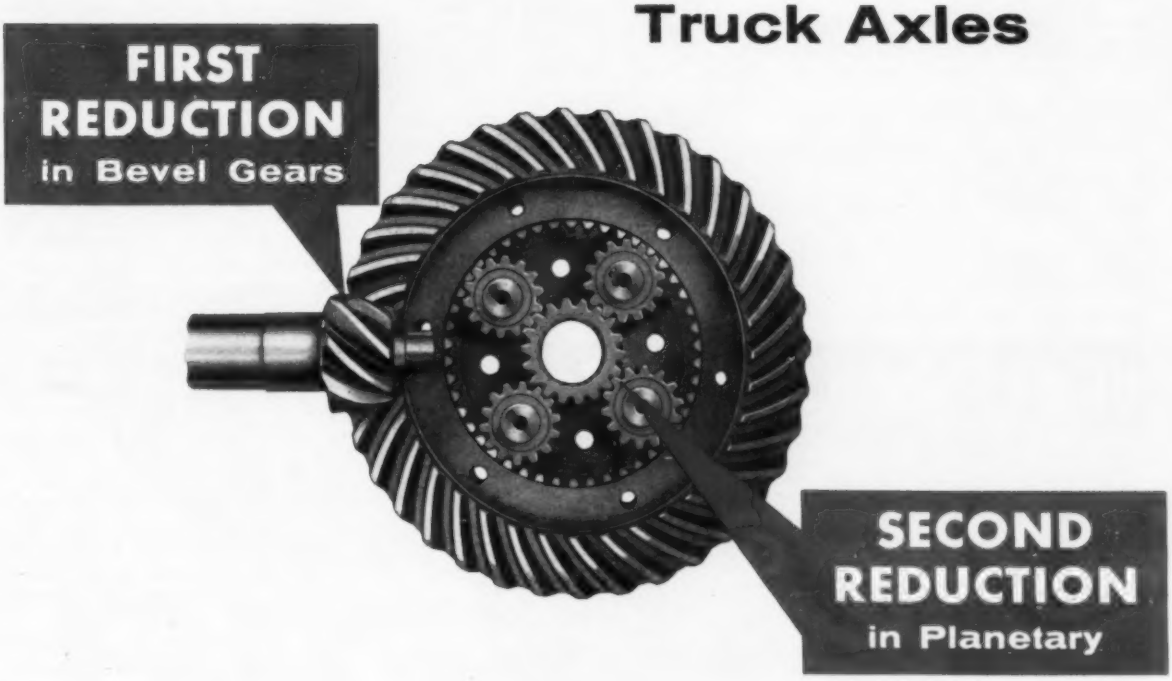
(5) Miscellaneous reference data commonly required by practicing engineers and designers.

Construction Handbook

Handbook of Heavy Construction. Prepared by a staff of specialists. Editor-in-Chief, Frank W. Stubbs, Jr., Professor of Civil Engineering, Purdue University. 1040 pages, over 600 illustrations. $18.50. McGraw-Hill Book Information Service, 327 West 41st St., New York 36, N.Y.

This newly published handbook presents the methods, data, and working information needed in all branches of heavy construction. It offers contractors, engineers, and others quick answers to a wide range of practical problems concerned with earthmoving, concrete, steel erection, highways, foundations and other areas of the field. Tables of data are included for figuring the costs of operating and owning equipment, output of equipment, economical use of materials, and other cost factors.

A New Concept in Double Reduction Truck Axles



Eaton Planetary Double Reduction

Gives You these Important Benefits!

Save Weight—Size for size, Eaton PDR Axles weigh less than conventional herringbone or spur gear axles, permit truckers to haul more legal payload.

Last Longer—In Eaton PDR Axles, gear tooth loads are equally distributed over four rugged "planet" gears; stress and wear are reduced, resulting in materially longer axle life. Eaton's forced-flow lubricating system provides positive lubrication to all moving parts, even at slowest vehicle speeds—a feature not available in other double reduction axles.

Cost Less to Maintain—When and if repairs are necessary, parts are readily available—most of them interchangeable with other Eaton Axles. Simple construction—similar to the famous Eaton 2-Speed Axle, with which all truck service men are familiar—holds maintenance labor to a minimum.

Previously, double-reduction axles have been available only in the extra heavy-duty sizes. Eaton PDR Axles are available in a wide range of sizes—the last word in equipment to meet the demands of today's hauling conditions. By actual comparison they cost less to buy, less to maintain. They have established outstanding performance records in all types of heavy-duty operation.

EATON

Ask your Truck Dealer for Complete Information about Eaton PDR Axles

EATON AXLE DIVISION MANUFACTURING COMPANY
CLEVELAND, OHIO

New Publications

Included in the book are chapters on excavators, tunnels, explosives, dewatering, pneumatically applied concrete, precast and prestressed concrete, intrusion grouting, electric-arc welding, timber construction, bituminous pavements, pipelines, cofferdams and caissons, pile driving diversion, construction contracts, safety, contractor's organization and other topics.

State Purchases Emergency Mobile Unit

A service to give aid and comfort to victims of disaster is the purpose of a "Highway Patrol Emergency Mobile Unit" recently purchased by the Kansas highway patrol.

The Patrol's primary duty is patrolling the highways of the state. This addition to its service will be centered in a new vehicle consisting of a former 37-passenger bus acquired from a bus company for a nominal sum and fitted with new tires and special facilities inside.

SKID PREVENTION RESEARCH (1959). Bulletin 219. Highway Research Board. 2101 Constitution, Washington, D.C. Price $1.40. This 73-page bulletin comprises the final reports of several committees to the First International Skid Prevention Conference, held at the University of Virginia in September 1958, together with other pertinent papers in the skid prevention field presented at the 38th annual meeting of the Highway Research Board.

ICE MELTING PROPERTIES OF CHLORIDE SALT MIXTURES. Bulletin 220. Highway Research Board, 2101 Constitution, Washington, D. C. Price $0.50.

This 24-page bulletin contains two papers given at the 38th annual meeting of the Highway Research Board: (1) By M. S. Kersten, L. E. Pederson, and A. J. Toddie, Jr., discusses the results of "A Laboratory Study of Ice Removal by Various Chloride Salt Mixtures." Included was a wheel test to approximate field conditions of melting application of chloride mixtures.

(2) By William E. Dickinson, describes field tests to determine the "Ice-Melting Properities and Storage Characteristics of Chemical Mixtures for Winter Maintenance."

STUDIES OF HIGHWAY DEVELOPMENT AND GEOGRAPHIC CHANGE, by William L. Garrison, Brian J. L. Berry, Duane F. Marble, John D. Nystuen, and Richard L. Morrill. University of Washington Press, Seattle 5, Washington. Price $7.50.

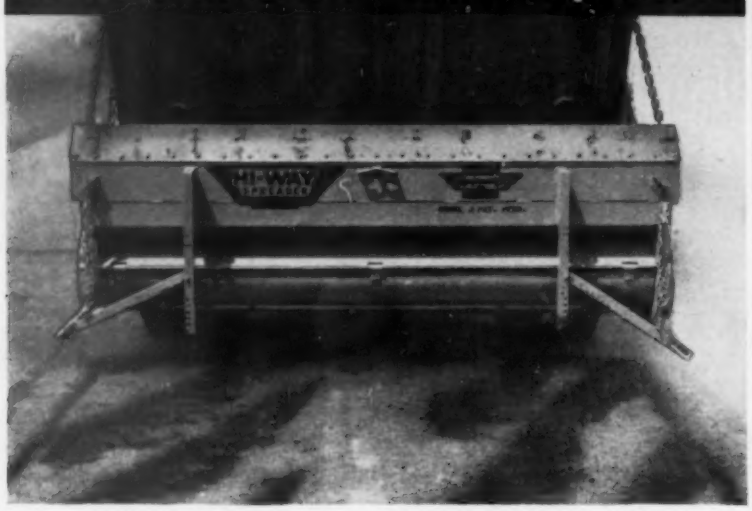
A survey of economic impact valuable to highway and urban planners, builders and administrators, as well as traffic engineers, realtors, taxation policy planners, and market analysts.

WELDED WIRE FABRIC REINFORCEMENT OF ASPHALTIC CONCRETE OVERLAYS. A technical bulletin published earlier this year by the American Road Builders Association; now available free through the Wire Reinforcement Institute.

Those interested in learning of the latest developments in the reinforced asphalt process may obtain a copy of the 16-page illustrated booklet by writing the above Institute, Dept. 238, National Press Building, Washington 4, D.C.

WILLIAM RODGERS has been named senior vice president of Blaw-Knox Company, Pittsburgh,

HI-WAY Model J Traction-Type Tailgate Spreader



EXCLUSIVE! Echelon Pattern Duplicates Hand Shoveling for Ice Control!

Spiral feed roller lays materials in heavier ridges that melt ice more effectively. Whereas thin blanket patterns can blow away. Pattern helps to identify curves, hills and stops . . . cautions drivers to slow down. This lower cost, one man spreader attaches to any standard truck frame allowing normal use of dump body. Feedgate controls coverage. Optional block-off plates adjust width of spread up to 9 ft. Forward and reverse transmission available.

Other Model J Features

- *From road-travel position to spreading in 5 minutes. Operates at speeds up to 30 M.P.H.*
- *Spring loaded spreader hitch for fast, one-man hookup or disconnect*
- *All bearings sealed for life*
- *Machine-cut steel sprockets and heavy-duty roller chain*
- *Available with grooved roller to spread blanket pattern for seal coating*

Write for the latest literature and complete specfications.

HIGHWAY EQUIPMENT COMPANY
624B "D" Ave. N. W. • Cedar Rapids, Iowa

HI-WAY S-P-R-E-A-D-E-R-S SALES & SERVICE

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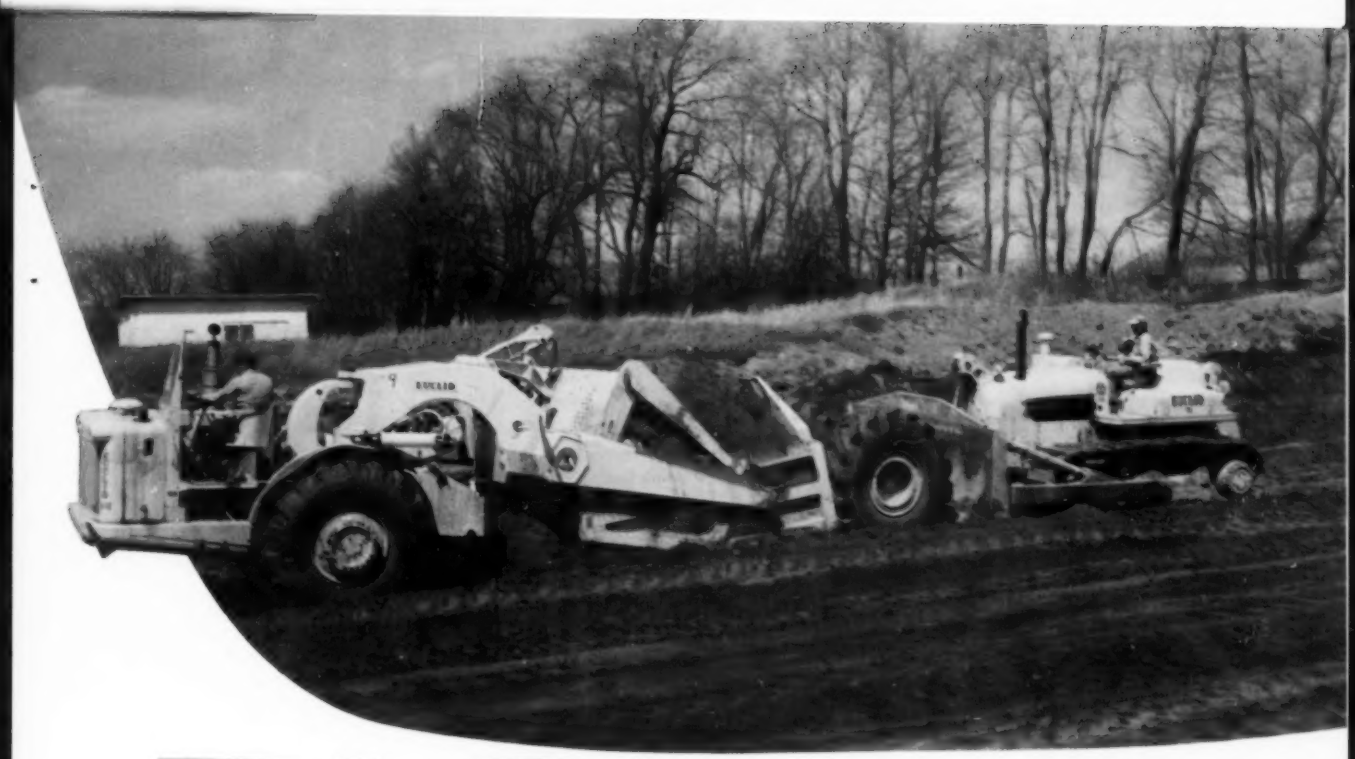
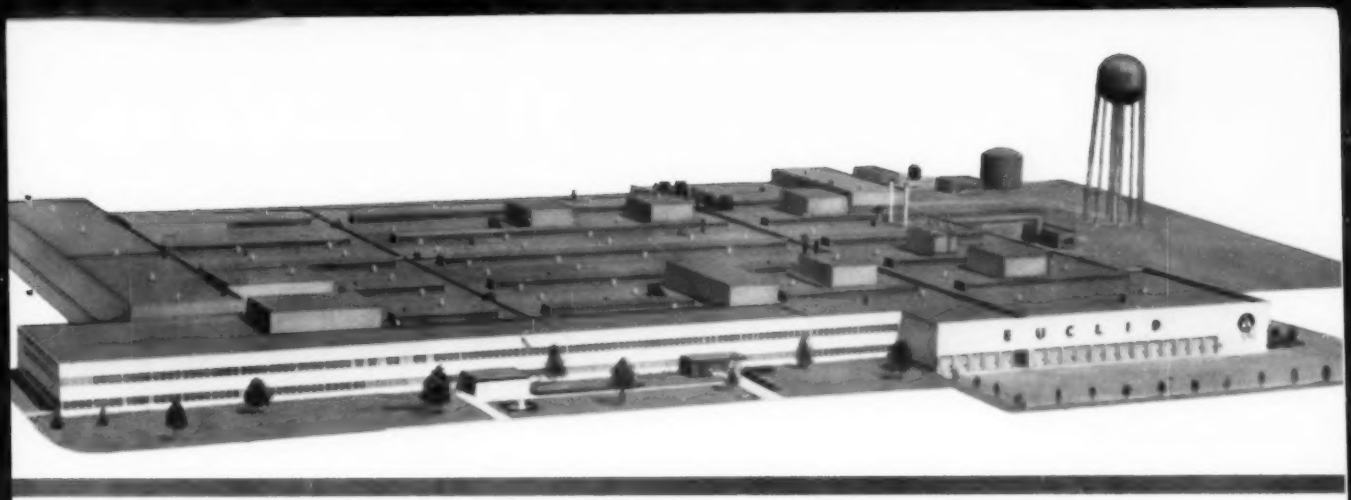


BIG CRAWLER TRACTOR NEWS FROM EUCLID!

C-6 Crawler now in production at Euclid's new tractor plant

A new concept in crawler tractor design, the Model C-6 is the most recent addition to the modern line of Euclid equipment developed and job proved during the past 5 years. Like the big twin-power TC-12 tractor, as well as 5 new scraper models and 4 new rear-dump haulers, the C-6 has the power, speed and versatility to get more work done faster and at lowest cost. All of these new "Eucs" incorporate years ahead engineering that has been a major factor in maintaining Euclid's leading position in the construction equipment industry for many years.

Now a big modern plant at Hudson, Ohio, designed exclusively for the manufacture of Euclid crawlers, is in production on Model C-6 and TC-12 tractors. Here every facility is provided to assure a uniform high standard of product quality that pays off in dependable long life performance of Euclids on every job.



C-6 sets a new standard in 200 h.p. tractor class

Brand new in every way . . . in functional design, ease of operation, service accessibility and productive capacity . . . but a "veteran" of many thousands of operating hours on a wide range of actual jobs and thorough testing at the proving grounds. No other machine in Euclid's history has ever been so completely proved for productive capacity and long service life before the start of volume production.

With 211 net h.p. and job proved Torqmatic Drive, there's a smooth, steady flow of power to match the work load. Changes from any speed range to another and from forward to reverse and back again, are made under full power . . . there are 3 speed ranges in forward and reverse, with a top speed of 7.9 mph.

Dry type air cleaner, full hydraulic track tensioning, independently suspended track frames and final drives, rear mounted cooling system, fewer lube points, and "package" assembly of major components are some of the other C-6 features that make this "Euc" outstanding for easy servicing and maintenance.

Compare and prove for yourself...

THE "EUC" C-6 IS THE LONG-NEEDED "STEP AHEAD" IN CRAWLER DESIGN

When you check all the things that really count in crawler performance . . . easy operation, maneuverability, power and traction for tough work, and minimum downtime . . . you'll see why the new C-6 is your best investment in the 200 h.p. class. No matter what the job is . . . heavy dozing and ripping, push-loading big scrapers, pulling heavy loads, stripping, land clearing, or handling stockpile assignments . . . the versatile C-6 cuts costs and gets more work done faster.

The Euclid dealer in your area will be glad to show you why the C-6 is your best bet for increased production at lowest overall cost.

EUCLID DIVISION OF GENERAL MOTORS
Cleveland 17, Ohio

EUCLID (GREAT BRITAIN) LTD.
Lanarkshire, Scotland

. . . a complete line of equipment for heavy earthmoving, mining, logging and many industrial operations . . .

Printed in U.S.A.

Flatbed Trailers owned by Rego help speed heavy equipment to job site. Wherever there's a job underway around Bristol you're likely to find Rego . . . and you're sure to find Cities Service fuels and lubricants.

In Bristol:

It's Rego for Roads Cities Service for Rego!

For 25 years, the town of Bristol, Rhode Island, has called upon Rego & Sons to build and repair its roads . . . and Rego has called upon Cities Service to fuel and maintain all equipment.

"Just as we had to prove our worth to Bristol, Cities Service had to prove its worth to us," says Manuel Rego. "We started out 25 years ago with just two trucks. A couple of breakdowns could have put us out of business. But we had trouble-free maintenance then and we've had it ever since, using Cities Service products.

"Today, we've always got six or seven jobs going at one time, jobs that keep our cranes, shovels, compressors and other equipment in constant service. We've built our reputation on hard work, and we're happy to have had hard-working lubricants to help us."

If you're looking for lubricants that can do more than their share of work, give more hours between overhauls than you'd rightfully expect, talk with a Cities Service Lubrication Engineer. Call the nearest Cities Service office or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Builds Swimming Pools, Too! Rego & Sons do wide variety of jobs for Bristol and its citizens, who have the highest regard for the firm and its work. Crane pictured here uses Cities Service C-300 Motor Oil to extend periods between overhaul.

Manuel Rego expects the same quality from his lubricants that he puts into his work. Says he gets it from Cities Service. Rego always has six or seven jobs going and can't afford breakdowns or idle equipment.

. . . for more details circle 296 on enclosed return postal card

RECOGNIZE THIS LOT?

It's the lot of a Caterpillar Dealer, one of over 300 in the U. S., offering you the best buys in used equipment!

No matter what you want in used equipment, no matter what the price range, your Caterpillar Dealer is headquarters for your best buy. No other dealer offers you "buys" with this protection:

BONDED BUY

1 **A "BONDED BUY"** up to $10,000 on used Cat-built equipment—your guaranteed assurance of satisfactory performance on *all* parts of the machine during the guarantee period.

2 **A "CERTIFIED BUY"**—his written guarantee covering units of any make.

3 **A "BUY AND TRY"** deal—his written money-back agreement on units of any make.

For the best buys in your area, to be *sure* of what you're buying, see your Caterpillar Dealer. You'll find him listed in the Yellow Pages!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

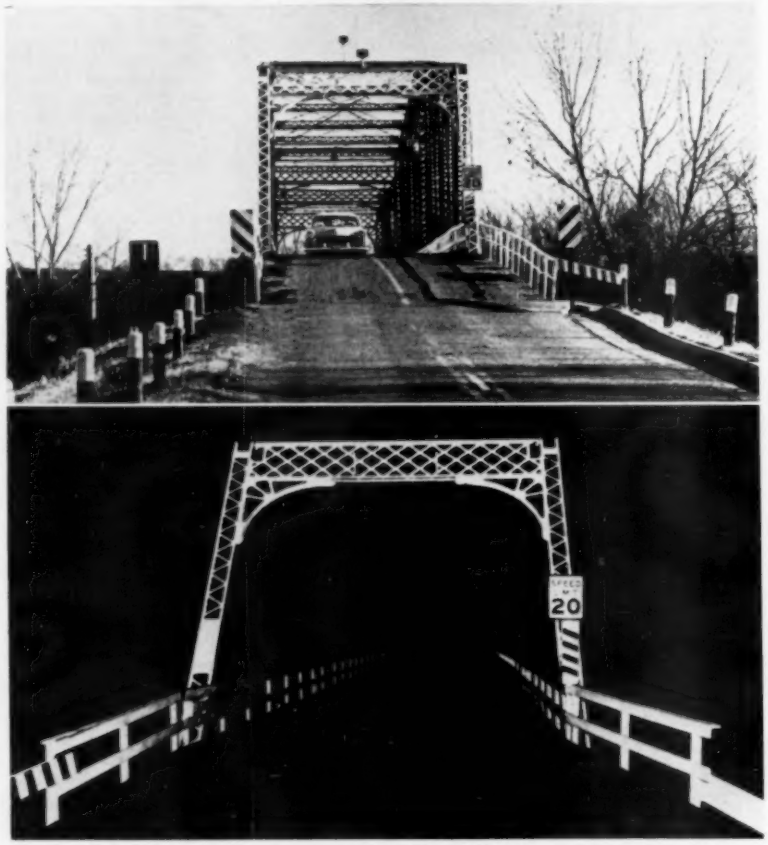
BEST BUYS IN NEW AND USED EQUIPMENT

. . . for more details circle 292 on enclosed return postal card

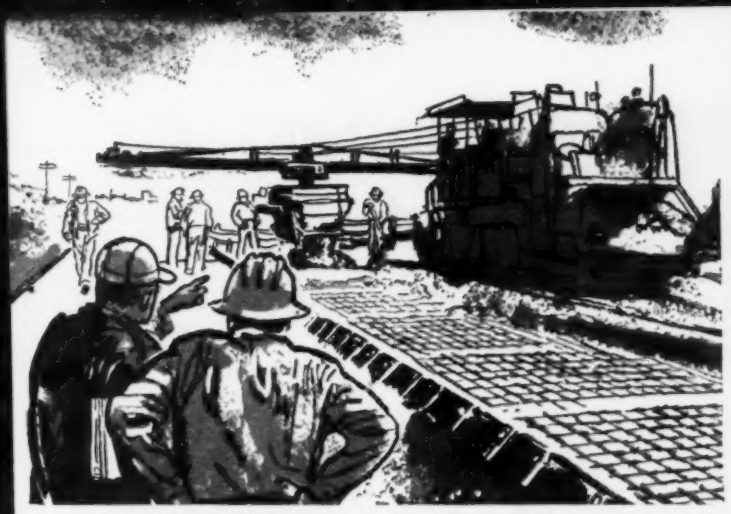
Firestone Starts New Tire Plant in Alberta

Construction of a multi-million dollar tire manufacturing plant by Firestone Tire & Rubber Company of Canada, Ltd., has started on a 50-acre site in Calgary, Alberta. The first tire manufacturing plant in western Canada, the new facility received a unique ground-breaking start, with a 12-cu. ft. scraper substituting for the customary spade.

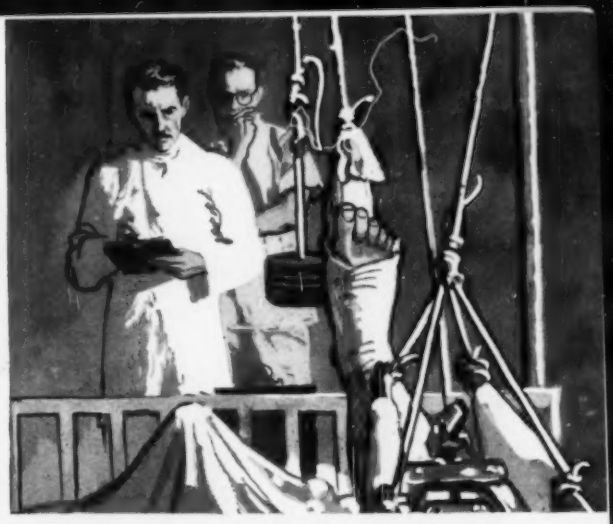
Old Bridge "Lights Up" at Night



As part of a program to improve nighttime visibility for motorists, the Minnesota state highway department has coated a bridge over the Minnesota River with a reflective liquid which is white by day and a reflective silver in vehicle headlights by night. The bridge is marked with "Codit" brand reflective liquid on all guard rails, bridge railings and both ends of the steel span. In darkness (bottom picture) the bridge is vividly visible to approaching drivers.



Highwayman in action. On big roadbuilding jobs, construction policyholders get the full-time services of a Liberty construction safety engineer. He works with your crew on all phases of the job to help prevent accidents. Our men have helped contractors cut compensation costs on such jobs as the Florida Turnpike and the Indiana Toll Road.



Broken bone gets new diagnosis. Liberty depends on 75 leading orthopedic surgeons in key areas of the U. S. to review diagnoses of serious cases, advise attending physicians. This medical advisory service helps speed the recovery and return to work of severely injured employees of policyholders.

Listening to rock molecules. Using a micro-seismic detection apparatus, a Liberty construction safety engineer listens for "squeaks" made by rock under strain. This device, developed by Liberty, makes it possible to foretell the collapse of a tunnel, helps policyholders prevent accidents, cut compensation costs.

New ways Liberty Mutual provides

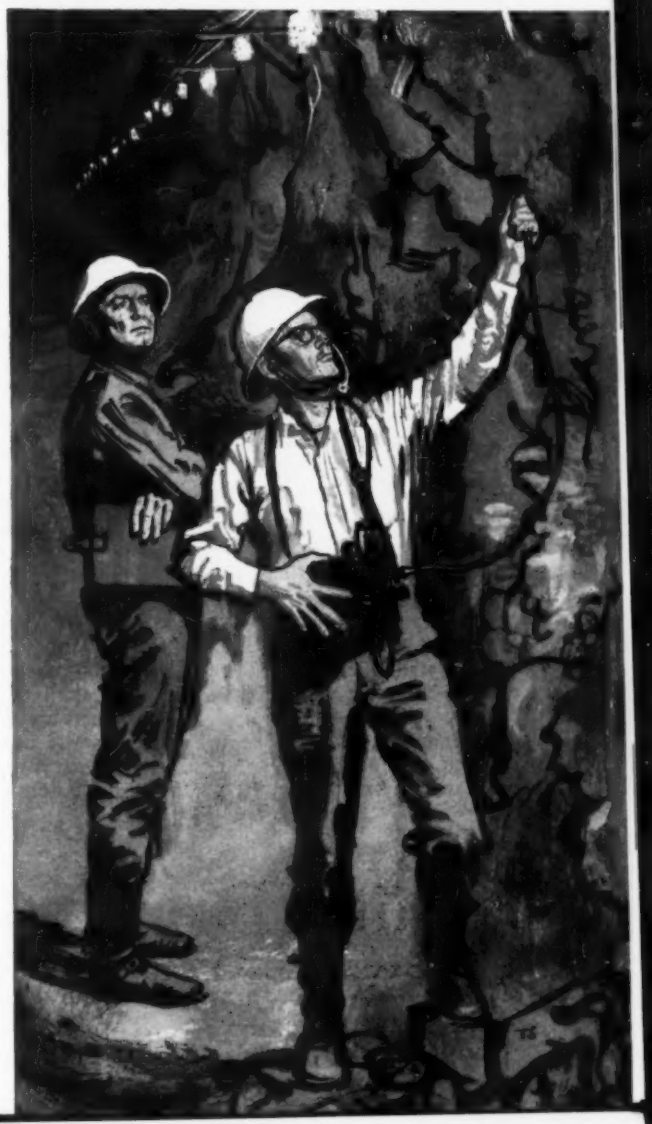
Protection in depth

to safeguard your people . . . to cut workmen's compensation insurance costs

A series of bad accidents or losses on your jobs can drive your compensation insurance rates up fast. At Liberty Mutual, we believe it is our job to help you prevent this. That is why we make available to our policyholders a wide range of extra services.

These services give you what we call protection in depth. Some of them are pictured on this page. All these resources are backed by the financial strength and experience of the largest writer of compensation insurance.

Liberty's protection in depth has helped hundreds of construction policyholders cut costs through rate reductions. And it has enabled us to return more than $491 million in dividends. To find out how protection in depth can help you with your compensation insurance problems, write or phone the nearest Liberty Mutual branch office.



Look for more from

LIBERTY MUTUAL

...the company that stands by you

LIBERTY MUTUAL INSURANCE COMPANY • LIBERTY MUTUAL FIRE INSURANCE COMPANY • HOME OFFICE: BOSTON
Business Insurance: Workmen's Compensation, Liability, Group Accident and Health, Fire, Fleet and Crime
Personal Insurance: Automobile, Fire, Inland Marine, Burglary, Homeowners'

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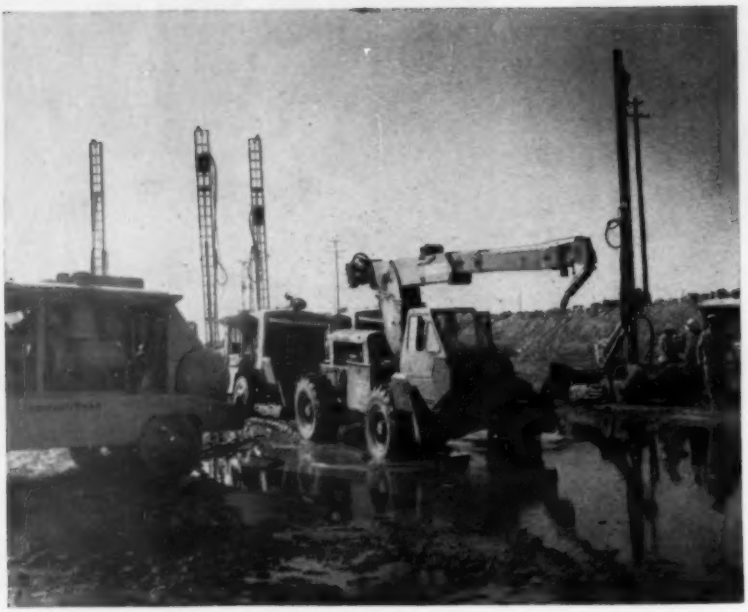


Muck and mire doesn't faze Austin-Western's powerful all-wheel drive hydraulic crane—shown here doubling in brass to tow heavy compressor-trailer on Niagara Power Project.

Austin-Western hydraulic crane . . . construction project workhorse

"We haven't got a single rig on the job that is more all-around useful and hardworking than the Austin-Western hydraulic crane." That's what Fred Sebastian, project manager for Gull and De Felice Construction Co., Niagara Falls, N.Y., says about the A-W crane.

"All-wheel steering gives it plenty of maneuverability to get in and out of the tightest places, yet it has enough speed to work fast in a large area. We work it double shifts and have never had any maintenance problems with it.

Handles, tows, totes and maintains

"It's a real workhorse on this job. We use it for everything . . . as a materials handling crane, to tow or tote, to maintain other equipment, and even as a back hoe.

"Our operators like it too. They seem to do a better job with equipment which they like and which doesn't tire them out. It's easy to operate with precision because of instant response from the hydraulic controls."

The Austin-Western hydraulic crane is a versatile all-purpose 5-ton crane with 18-ft. telescoping boom. Full circle swing permits loading from front, rear or sides.

All-wheel drive and steering

All-wheel drive delivers plenty of power and traction for top performance under all surfaces and weather conditions. All-wheel steering permits an extremely short turning radius . . . maximum maneuverability. It is designed and built by Austin-Western to do more work with minimum maintenance.

Learn today why A-W crane owners are so enthusiastic about this versatile construction workhorse. Contact your nearby Austin-Western distributor or write us direct.

Austin 100th YEAR Western

CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

. . . for more details circle 279 on enclosed return postal card

Blasting Advances Reviewed

The "split-second" electric blasting cap is probably the most important explosive development of the past decade.

So spoke Stuart A. Currie, newly appointed contractor service manager, explosives and mining chemicals department, American Cyanamid Company.

Speaking before employees of Employers Mutuals of Wausau at a recent safety seminar in New York, Mr. Currie described the importance of these products to the contractor or quarry operator. The millisecond delay action provides a higher degree of fragmentation that is similar in some respects to a grinding or crushing operation.

Split-second caps tend to reduce and, in a good number of instances, eliminate the very troublesome and costly problem of vibration complaints, Mr. Currie reminded. "The same type of action that occurs in the rock mass also takes place in the detonation wave. If a shot is fired using regular electric blasting caps or all Primacord, a solid pressure wave moves out from the blast in all directions almost instantaneously. By substituting split-second caps, this wave is broken and distorted and its damaging effect is reduced."

Some of the other advances made by explosives companies include Saf-T-Pak torpedo tubes developed for safer gas-well shooting; interlocking shells, which give a constant solid column of explosives in any desired length for seismograph work; and—of practical importance to the highway contractor—insensitive nitro-carbo-nitrates, packaged in spiral-wrap shells, jute bags or multiwall paper bags.

The use of shipping tube containers for some of the larger-size cartridges has eliminated boxes. According to Mr. Currie, this development has the dual advantage of safer handling and faster loading in the bore hole. Longer-length, small-diameter cartridges have also saved loading time and reduced exposure time for the men in the blast area.

In the past few years, the use of ammonium nitrate as an explosive

has made its impact on the explosives industry. Its lower cost appears to overshadow the disadvantages connected with its use. However, if extra labor, equipment and other costs are considered, Mr. Currie pointed out, the actual cost of this material would not be too much less than that of some of the readily available nitro-carbo-nitrates manufactured by the explosives companies.

Unique Welder Developed by Army Engineers

Development of a welding machine to weld hard-to-weld thin gauge materials (immediately, for support of the U. S. Army missile program) has been announced by the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Virginia.

Trailer mounted and gasoline engine driven, it is a shielded inert gas arc welder. It differs from the conventional DC welder in that it furnishes both AC and DC welding current for metallic arc or tungsten inert gas welding. This unit also provides DC for metal inert gas welding and consumable electrode process welding by attachment of any of the several commercially available wire feeders and consumable wire guns. This includes push or pull and water or air-cooled type guns up to 300 amperes.

Other features built into this welder are 1 KW, 115 volt DC auxiliary power while welding; 10 KW, 115/230 volt AC single phase, 60 cycle power; built-in high frequency stabilizer that can be used continuously or for start only, as required for the welding method employed; automatic inert gas control with solenoid valve and post-flow timer; a three-position selector switch to provide AC welding or the choice of either straight or reverse polarity DC welding, and a built-in and concealed 20-gallon capacity coolant system with electric pump to supply cooling liquid for welding as required.

The weld and power generator is comprised of an engine driven, revolving field, single phase alternating current with 115 volt DC excitation provided by a directly coupled exciter. The welding power is fed through the necessary controls and a heavy duty semi-metallic rectifier to provide DC welding current.

The welder was developed jointly by the Laboratories and the Miller Electric Company, Appleton, Wisconsin.

Austin-Western's exclusive front-end power gives a pulling assist to rear tandems for more power at the blade.

Power in front—steer in rear . . . Austin-Western does more work, speeds Michigan paving job

"Our two Austin-Western Super 88 graders do more work than any two competitive graders," says Louis Toccalino of G. Toccalino & Sons, Livonia, Mich.

"It's the only machine on the market that can do both close work and open road work, rough and finish grading, ditching and sloping . . . everything, equally well. And it has plenty of balanced power and traction for rugged work on any surface.

No downtime or maintenance problems

"One of our machines is a year old; we've had the other for 2 years. We've really kept them busy, but we haven't had any downtime or maintenance problems.

"The A-W combination of power in front and steer in rear really speeds construction. You can do work with an A-W that you wouldn't even consider attempting with other graders."

Austin-Western's exclusive front-end power means that every pound of the machine is alive and working . . . no dead-weight front ends on an A-W. All-wheel steering lets you steer the rear to move straight ahead; compensates for powerful sidethrust of a fully loaded blade.

Operators do more work, more easily

Operators like A-Ws because of the positive-action hydraulic controls that let them do so much more work better without getting tired out.

Ask for the full story now on this versatile tandem grader that does so much more work. Learn exactly why contractors like Toccalino in Michigan say, "We wouldn't buy any other machine for grading!" Contact your nearby Austin-Western distributor or write direct.

Austin 1859 AUSTIN-WESTERN 1959 100th YEAR PARTNERS IN PROGRESS Western
CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

. . . for more details circle 280 on enclosed return postal card

GET MORE YARDAGE OUT OF YOUR BUDGET WITH OLIVER OC-126

OLIVER "SPOT-TURN" gives you instant, short-turning action as dramatically shown in the photo above. Result: faster loading, more productive cycles per hour. What's more, Oliver "Spot-Turn" is safer. You get pivot-turns with the stationary track locked. There's no unbraked, free-rolling hazard. Try this advanced "Spot-Turn." See the new speed that Oliver has brought to dozing, loading and other road jobs.

...one demonstration will prove it!

Take advantage of the extra power and production that are yours in this great Oliver crawler. *EXTRA POWER* because Oliver tractors are modern, *live weight* crawlers with more power geared to the job of moving or loading dirt and road-building materials. *EXTRA PRODUCTION* because Oliver's exclusive "Spot-Turn" steering gives you greater maneuverability, more work cycles, easier and quicker operation.

TRY THE OC-126's NEW SPEED AND POWER. You'll be amazed at the performance of this full-featured crawler in the popular size range. Its high-clearance design makes it tops for road work. Its extra-rugged track frame and heavy-duty construction give it true job-staying dependability.

WORK-TEST AN OLIVER on your own road jobs. Call your Oliver distributor today.

THE OLIVER CORPORATION

Industrial Division, 19300 Euclid Ave., Cleveland 17, Ohio

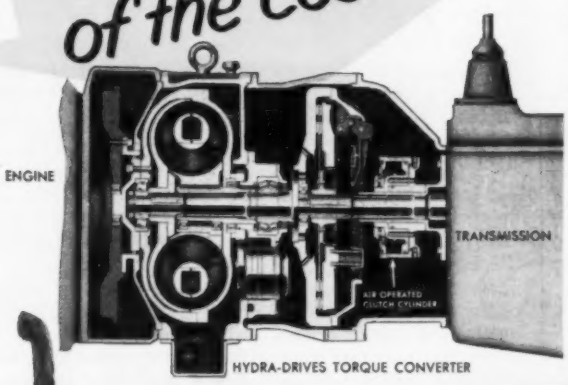
a complete line of industrial wheel and crawler tractors and matched allied equipment

. . for more details circle 339 on enclosed return postal card

HYDRA-DRIVES®

TORQUE CONVERTER WITH A STICK SHIFT TRANSMISSION!

Now! Many Of The Advantages Of Power Shift Transmission *at a fraction of the cost!*

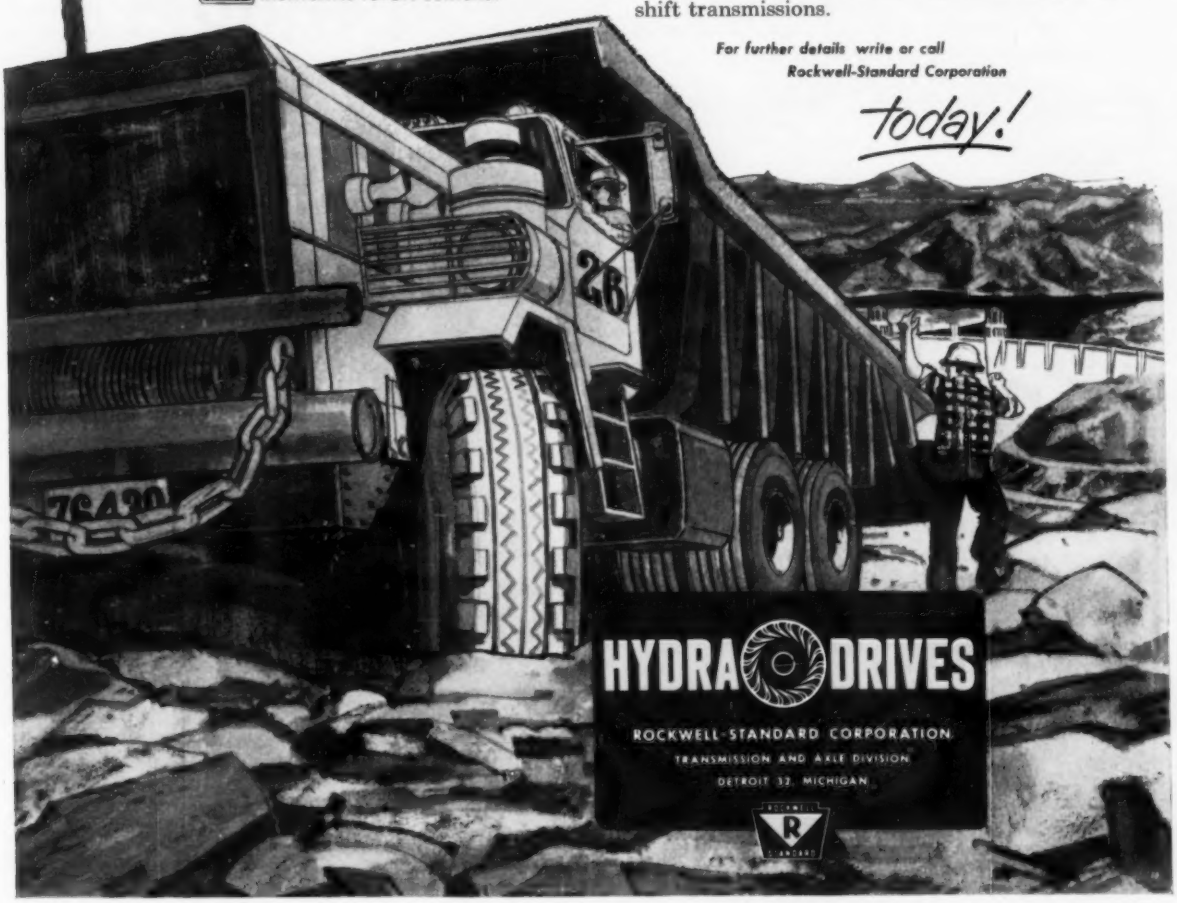


HYDRA-DRIVES TORQUE CONVERTER

Lower in initial costs, Rockwell-Standard's Hydra-Drives Converter with stick shift transmission reduces operating and maintenance costs on heavy-duty off-highway trucks. You get these five major advantages plus many others:

1. Up to 80% of shifting is eliminated. Select a transmission ratio to fit the haul, and let the converter handle the changing load conditions with a minimum of gearing. Any required shifting can be done while truck is in motion!
2. Greatly reduces shock loading on all drive components.
3. Clutch adjustments and wear problems minimized.
4. A minimum of driver training is required.
5. Cost is hundreds of dollars less than full power shift transmissions.

For further details write or call
Rockwell-Standard Corporation
today!



ANOTHER PRODUCT OF **ROCKWELL-STANDARD** CORPORATION

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Plowing an AIRPORT or PARKING LOT, CITY STREET or EXPRESSWAY . . .

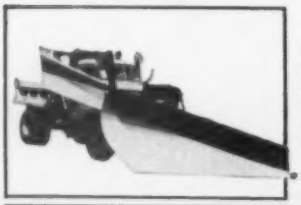
Think of

FRINK

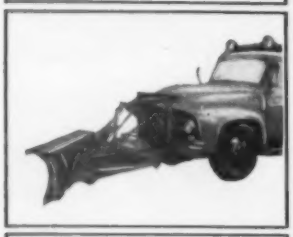
—The Plow Designed to Meet YOUR Snow Removal Needs

Whether snow removal problems in your area require a high-speed, heavy-duty V-type plow **(above)** or a lighter, maneuverable Reversible type, Frink has the plow specifically designed to do the job . . . faster, safer, at lower cost.

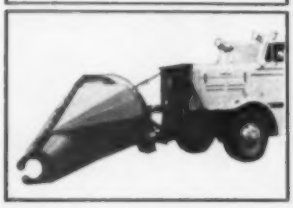
Frink, the pioneer in advanced snow-plow design, makes four basic types of plow, each with models to fit 1½ to 12 ton trucks . . . and most are interchangeable on same truck attachment. Get full details from your Frink distributor or write Frink for descriptive folders about any of these plows —



ONE-WAY Snow-Plow with Trip Blade
Finest speed plow made . . . tapered, curved moldboard throws and spreads snow to minimize deep banks, yet windrows neatly at city speed.



REVERSIBLE PLOW with Trip Blade
The all-purpose plow . . . throws right or left, or bulldozes straight ahead . . . cab lever sets position automatically, even while plowing.



ROLL OVER Plow with Taper Blade
Made only by Frink . . . can rotate to left or right position in 15 seconds . . . high-speed for deep snow . . . ideal for airports and dual highways . . . ends deadheading . . . easier to park.

V-TYPE Sno-Plow (shown at top)
Rugged powerhouse for heavy-duty plowing . . . self-ballasting to keep nose down, prevent side thrust . . . bevels side banks . . . will not wedge . . . safe at high speed . . . economical in use.

For Snow Plow Know-How It Pays to Think of FRINK SNO-PLOWS

FRINK SNO-PLOWS, INC., CLAYTON, N. Y.
Eastern Steel Products, Ltd., Preston, Ontario-Canada

. . . for more details circle 312 on enclosed return postal card

Recommended Practice for Hot Weather Concreting

The American Concrete Institute has adopted as a Standard, a recommended practice for hot weather concreting, subject to ratification by letter ballot.

This standard provides information useful in minimizing detrimental effect of hot weather on concrete. Data are given for reducing concrete temperature by proper attention to ingredients; methods of production and delivery; care in placement, protection, and curing; and use of admixture to reduce mixing water requirements and to retard setting. Emphasized is the importance of meticulous attention to standard procedures in testing concrete made in hot weather.

The problems of concreting in hot weather have been increased in recent years by a number of factors, including more finely ground and more rapidly hardening cements, handling of larger batches; use of thinner structure sections, and increased speeds in construction operations.

The harmful effects of hot weather on concrete may be minimized by a number of practical procedures. One or more of the ingredients may be cooled to keep the temperature of the concrete from being excessive at time of placement. Cement content, because of heat of hydration, should be kept at the minimum permitted by the work. Forms and reinforcing may be protected from direct sun and cooled by sprinkling. Suitable attention to scheduling of delivery and placement to avoid excessive mixing or delays contributing to stiffening will be beneficial. Concrete in place may be protected so as to minimize drying and absorption of heat.

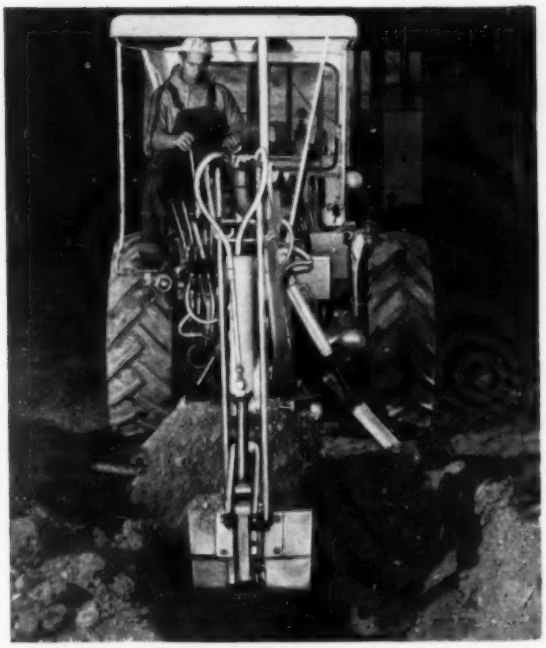
The most direct approach to keeping concrete temperature down is by controlling the temperature of its ingredients. In warm weather, the actual temperature is likely to be slightly higher than the calculated temperature because the computations do not take into account heat of wetting and hydration of cement, nor that generated by the mechanical work of mixing. Shading stockpiles from direct rays of the sun helps some. Sprinkling stockpiles and keeping them moist results in cooling by evaporation, this being especially effective when humidity is low.

Pound for pound, the mixing water has the greatest effect of any of the ingredients on temperature of concrete, since it has a specific heat about 4½ to 5 times that of cement or aggregate. Under certain circumstances, reduction in water temperature may be most economically accomplished by mechanical refrigeration or mixing with crushed ice. Use of ice as a part of the mixing water is highly effective in reducing concrete temperature since, on melting alone, it takes up heat at the rate of 144 Btu per lb. To take advantage of the heat of fusion, the ice must be incorporated directly into the concrete as a part of the mixing water. Conditions must be such that the ice is completely melted by the time mixing is completed.

Other elements of importance in controlling temperatures of concrete involve cooling of cement, use of admixtures to retard hardening, production and delivery, placement and finishing, protection and easing, and temperature records.

Specific methods for the accomplishment of these objectives have been outlined in this Standard. Write American Concrete Institute, P.O. Box 4754, Redford Station; Detroit 19, Michigan.

Moline power, ruggedness, speed service line trenching



Moline direct-drive pump boosts backhoe capacity — The Moline 445 Wheeler powers this backhoe through a rear-mounted hydraulic pump, direct-driven from the crankshaft. Direct-drive steps up efficiency, eliminates unnecessary drive gearing, improves fuel economy. Side-mounted pumps are also available.

Milwaukee contractor cites fast response, low maintenance on Moline 445 Industrial Wheeler

"We've operated our Minneapolis-Moline 445 Wheeler on trenching jobs for the past 12 months," says Paul J. Grunau of the Grunau Company, Milwaukee, Wisconsin. "We like the fast power response and all-around ruggedness of our Wheeler. Down time and maintenance cost has been *practically nil.*"

Grunau's Wheeler is equipped with a Moline backhoe and ¾ yard loader. Trenching operations have taken the unit over soft and rough grade, inside and out of buildings, excavating and backfilling for sewer and water lines, as well as loading and boom work.

Moline Industrial Wheelers offer many profit-making advantages on rugged, year-round construction service. Husky, Moline-built high-turbulence diesel or gasoline engines, optional shuttle reverse or Ampli-Torc 12-speed drive, direct-drive hydraulic pumps—and built-in hydraulic steering speed work cycles . . . cut job costs.

Heavy-duty Moline Industrial Wheelers are available in 4 sizes, with diesel or gasoline engines, complete with Moline loader-backhoe attachments.

Check with your Minneapolis-Moline Dealer for facts on the newest in work-tested construction equipment.

MINNEAPOLIS MOLINE

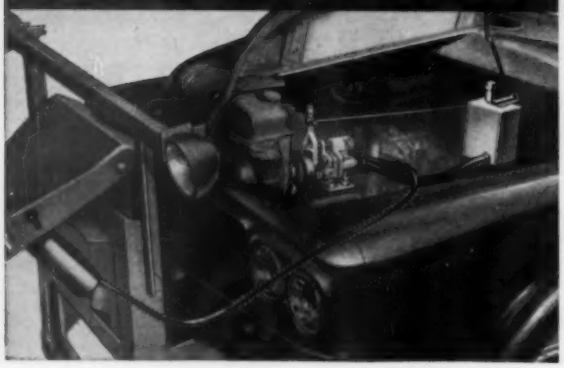
. . . for more details circle 337 on enclosed return postal card

Cut snow removal costs up to 50%

Gar Wood

SNOWLIFT

HYDRAULIC SNOW PLOW CONTROL



featuring the ALL-NEW, FASTER ACTION

HYDRA-CLUTCH® PUMP

Exclusively from Gar Wood, the Snowlift Kit features the only clutch-type pump available for snow plow control. With the Hydra-Clutch Pump, the pump gears are set in motion only when lifting the plow blade. This means far less wear and longer life for the pump. In addition, this hydraulic system puts no drain on the battery.

Here's the "POWER PLANT" of the New SNOWLIFT

The Hydra-Clutch Pump develops tremendous power... blade can be raised completely in six seconds to avoid open spaces or obstacles. The Snowlift Kit consists of the Hydra-Clutch Pump, cylinder and the complete hydraulic system.

Get the "cost cutting" story on the new Snowlift from your Gar Wood distributor or snow plow dealer.

Wayne, MICHIGAN

Richmond, CALIFORNIA

Gar Wood INDUSTRIES, INC.

... for more details circle 317 on enclosed return postal card

Booklet Describes Work of International Contractor

A booklet entitled "Men, Methods & Machinery", is an example of the promotional publishing being done recently by various large contracting firms.

This 52-page brochure tells the accomplishments and facilities of Construction Aggregates Corporation of Chicago. The firm does earthmoving, trenching, land reclamation and similar undertakings and has completed projects in many countries of both hemispheres.

For English or Spanish edition interested agencies should write this company, 120 S. LaSalle Street, Chicago 3, Illinois.

States Act to Speed Right-of-Way Acquisition

Procedures used in acquiring rights-of-way for highways have received attention in state legislatures this year, according to the National Highway Users Conference. Action has been taken on bills in eight states. Measures are pending in six states.

Indiana: A law authorizes the highway department to acquire, by purchase or condemnation, the fee simple title in land held by any city, town, or public corporation. Another law requires the department to submit a voucher to the clerk of the circuit court for escrow purpose in condemnation proceedings.

Iowa: A new law permits the highway commission to rent property acquired for highway purposes but not immediately needed.

Maine: A law authorizes the legislative research committee to study the procedures relating to determination of damages caused by the taking of land for highway purposes.

Montana: A new law authorizes the highway commission to exchange land no longer needed for highway purposes for other real property, provided such land is first offered to be sold back to the original landowner or his successor in interest. Comparable legislation was approved in Minnesota and Nevada.

New Mexico: Approved authorizing the state to take possession, at the beginning of condemnation proceedings, and providing protection of the property owner's interests. This is done by requiring an adequate bond prior to the vesting of title and a speedy judicial determination of the total just compensation due.

North Dakota: Counties are relieved from any right-of-way expense for the state highway system.

Bid Prices Declined

The cost of highway construction in the second quarter of 1959 dropped 2.7 percent, the largest quarterly decrease since 1954, according to the Bureau of Public Roads. The decline is in marked contrast to the 0.6 percent increase in the Bureau of Labor Statistics consumer price index during the same 3-month period.

Trends in highway construction costs are measured by an index of average bid prices compiled by the Bureau from reports of Federal-aid highway construction contracts awarded by state highway departments.

The sizeable drop in the index in the 1959 second quarter follows a 0.6 percent decrease in the previous quarter, but does not necessarily indicate a downward trend in highway construction costs, noted the Bureau. The small fluctuations of the past several years, together with the latest change, appear to indicate continuance of a trend of stabilization in prices.

Two-mile-long airport runway in the Susquehanna River rests on a foundation of Bethlehem blast-furnace slag. *Contractor:* C. J. Langenfelder

Air Force Runway Built on Slag in Susquehanna River

Olmsted Air Force Base, Middletown, Pa., was unable to accommodate jet aircraft on its existing runways. Nor was there room for expansion—except in the Susquehanna River. The river proved to be the best location for a two-mile-long runway.

The twin problems of constructing a solid runway foundation, and a levee to protect the runway from high river water, were solved by using blast-furnace slag from an adjoining Bethlehem steel plant. The levee and runway foundation took 4 million cu yds of slag—one of the largest single uses of blast-furnace slag on record.

Construction of the runway base required an additional 1½ million cu yd. The amount of slag used for both jobs would fill a train of hopper cars 467 miles long.

Blast-furnace slag had two distinct advantages: when only six inches above water level, it consolidated to such a degree that 60-ton hauling units could operate over it. Secondly, because compaction of slag is little influenced by moisture, work could continue even after heavy rains.

In addition to the slag, Bethlehem supplied all the steel reinforcement used in the concrete pavement.

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The Long-Range View

NOW that Congress has finally voted funds for keeping the Interstate highway program at least on the move, there is a general feeling of relief in the road building industry. The concensus among those who were close to the Washington hassle is that we were lucky to come out as well as we did.

This, of course, is a turn in our psychology. The long-range program as it was hopefully launched in 1956 has been burdened from the start with features that have kept it in a state of uncertainty. The goal of a 13-year construction program has lost whatever sanctity it initially enjoyed, and the finish line has been moved farther back into the '70s for the present.

It seems a shame that the Congress which urged the highway departments to reach an obligation level of $2.5 billion yearly in Interstate work should now cut back to $1.8 billion. Little wonder that the administrators in the road building industry are looking upon Congress as an "Indian giver."

Yet here is a fact of life the highway fraternity apparently must live with—that the national highway program will have its ups and downs.

Can we live with this kind of situation? Of course we can. This is the history of the road program in nearly every state in the Union. We have lived with uncertainty at the state level for decades. The industry can continue to flourish and produce highways despite uncertainty. True, it is costly—hard on the planners who want 5 and 10 year programs, and hard on the contractors and manufacturers who wish they knew just when to expand and when to relax.

But these men know—despite long experience with the vacillating fortunes of state highway work—that planners need time. With the long "lead time" required for applying sound procedures, the leaders must continue to think in terms of 5, 10 and even 15 years ahead. And the industry must continue to expand for the long haul.

To fail to expand the highway effort would be to fail to capitalize on what is still a promising future of the industry as a growth industry. The statistics are still there: all the pressures of population growth, highway transportation expansion, auto and truck ownership growth, decentralization and relocation of cities and industries with the generation of constantly greater traffic volumes everywhere.

These statistics cannot be denied. They presage an increasing level of highway system development.

Congressmen know this as well as we do. Anyone who assumes that the Federal-Aid Highway Act of 1959, just passed, reflects the real intent of our national legislators, is making a grave error in judgment. Congress was caught in a political bind. This will probably happen again from time to time. But more often than not, Congress will push the federal-aid road program upward. The temporary setbacks will be more than recovered in the wholesome climes that will prevail.

The national highway program may not be as orderly as we would ideally desire it to be. But if the general direction is *upward*, there is cause for business-like optimism.

Bigger Tires Here—

Bigger Earthmovers Coming?

Several of the big MRS-Wooldridge scrapers working in the big rock cut that was handled with the help of 37.5-inch tires.

By Frank W. Fox

Sales and Service Engineer (retired), Goodyear Tire & Rubber Company

Many contractors have wondered when the next evolutionary step in tractor-scraper size will be taken. Here is one contractor's pioneering experience, and a discussion of the 37.5-inch tires and 600-horsepower engine involved. Also a look at the 44.5-inch tires coming next.

Bigger earthmoving machines are somewhere in the offing.

Recent announcement of a new earthmover tire, much larger and with more load capacity than any previously available, suggest this prediction.

Just over the horizon on drawing boards of the manufacturers are new model scrapers in the 40-50 cubic yard capacity range. It goes without saying that these bigger machines will be an important competitive asset in the sharp bidding for jobs. They're likely to set a new pace on Interstate Highway programs and other big undertakings throughout the world where great quantities of material must be moved at lowest cost.

Early model scraper with reinforced ply airplane tires—one of the pioneer rigs that started revolution not yet ended.

The outfit Replogle Company used in its pioneering—a MRS 200 special tractor with a Cummins 600-hp engine and Wooldridge 300 scraper having 36 cu. yd. struck, 41 cu. yd. heaped capacity. (Note: Wooldridge's successor name, Curtiss-Wright.)

Tires have always been the crux of scraper design advance. It began in the middle thirties, when R. G. LeTourneau was building his first self-loading scrapers in California; he equipped them with beefed-up airplane tires. For each step-up in vehicle size, since then, there first had to be developed a new and larger tire.

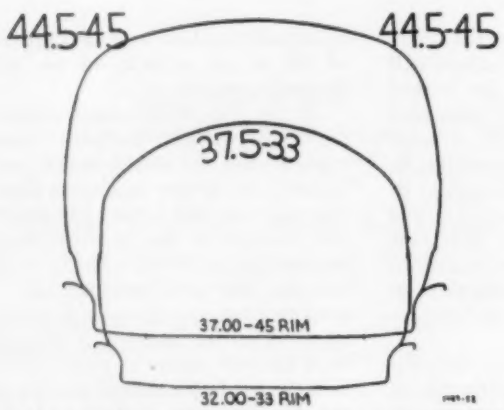
Contractors now are thinking about the probable results to be obtained from machines double the size of the average ones in use today. The forward-looking contractors will be the winners of the job and profit race in the "sixties." The equipment makers still have a long way to go before actually setting up test schedules and getting ready with a sales story, but it seems reasonable to believe that history will repeat itself in this next size step-up. We have only to consider the performance of the biggest machines now in use, the introduction of which was a size jump of comparable magnitude.

Turn for example to the experience of C. F. Replogle of Circleville, Ohio. This company was the prime mover in development and the first user of scrapers of 36 cu. yd. struck, 41 cu. yd. heaped capacity.

After the 1954 construction season, Replogle became convinced that he could make out better with larger machines than the rigs then available. He made the rounds of the tractor and scraper plants of the country with his plea for a 50 percent larger scraper than any then in production. Also he wanted a tractor with enough power to pull it. Unable to get fast enough action in the Midwest, he turned to California and the Wooldridge Mfg.

How soon will you be using this size? Goodyear's latest, the 44.5-45, has following dimensions: 46.64 in. section width; 117.7 in. overall diameter; 50.8 in. radius; 152.3 cu. ft. volume (32 ply rating); 3,376 lb. weight of tire; 2,200 lb. weight complete rim.

The first two sets of big scraper tires being delivered on Replogle's flatbed.



Visual comparison of size between the present 37.5-33 and the 44.5-45 tire.

Co. where he found daring souls and cooperation. By late spring of 1955 he took delivery of two scrapers of the desired capacity. For his power he went to Jackson, Miss., and got tractors with Cummins VT12 motors with up to 600 hp and the MRS weight transfer feature. This hydraulic transfer shifts part of the load of a 4-wheeled scraper to the tractor's drive wheels when extra traction is needed.

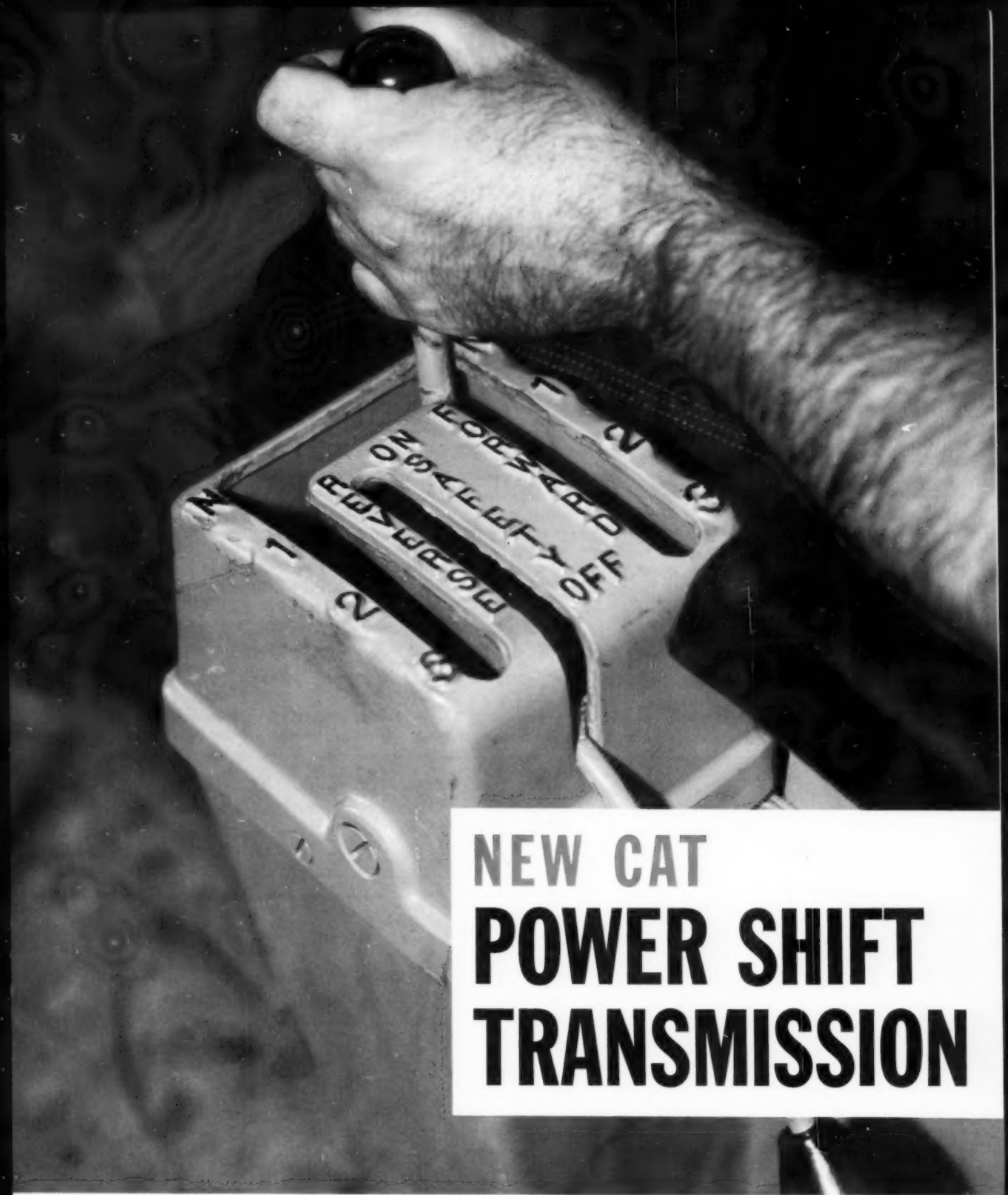
After a short and very satisfactory workout, two more rigs were ordered. Today after more than four years of operation on dozens of projects throughout Ohio, all four tractor-scraper units are still going strong and proving the soundness of Replogle's ideas. These machines figured importantly in removal of 1,100,000 cu. yd. of sandstone from a big cut on Ohio Route 1 near Mansfield in 1958 (See Job review in Roads and Streets, March, 1959).

One of the essential new features of the new size machines was their tires. The tires had greater load carrying ability than any previously used. The tires were the result of development undertaken by Goodyear at Akron. Involved was the making of a new large size, the 37.5-33, for the scraper rear wheels, to give capacity for the load and flotation in soft going in borrow pits and the fills. These 37.5 tires outmatched the next smaller size (33.5s) by about 2½ tons each in equivalent ply rating construction. More importantly, while the 33.5 size made with extra plies could carry up to about the estimated load, the 55 psi inflation required would have been too high. The 37.5 tire would handle a load of 41,400 lb. with 40 psi of air—and so eliminate the need for frequent calls for help in getting through soft spots.

At the front end of the scraper two 33.5 tires are mounted close together beside the gooseneck which rests on the tractor. They trail only a short distance behind the tractor wheels; hence the front end weight is well distributed and the whole rig can roll freely in most kinds of going.

Now that Replogle's four ma-

(Continued on page 92)



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PAYS OFF FOR YOU AGAIN! A multimillion-dollar research program—to meet the continuing challenge of the greatest construction era in history with the most productive earthmoving machines ever developed.

NEW POWER SHIFT TRANSMISSION for CAT D9 and D8 TRACTORS

Shifts on-the-go under full load in a split-second! ▪ Changes speed, reverses direction with finger-tip control lever—and no clutching!

The wraps are off—it's ready. After many years of research and on-the-job testing, Caterpillar now offers a revolutionary new transmission option for Cat D9 and D8 Tractors—power shift. The most recent Caterpillar new product development, this new transmission—with an exclusive design—provides production highs never before possible with a track-type tractor. Here's why:

1. It combines for the *first* time the flexibility and anti-stall features of torque converter with the operating snap of direct drive! And because of its direct drive characteristics, it is more efficient than other power shift designs.

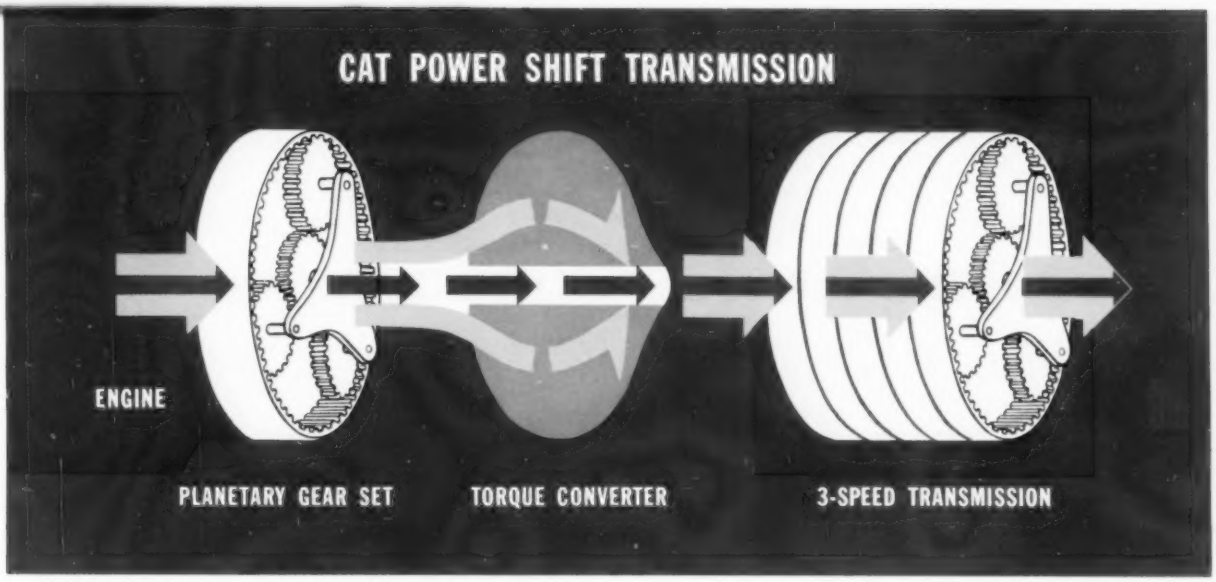
2. With one control lever and no clutching, it reverses direction . . . changes speed . . . smoothly . . . under full load . . . in a fraction of a second!

Talk about productivity—Cat power shift delivers in a big way. Split-second, on-the-go shifts give plenty of power in the highest gear possible. Shifting is so easy the operator just naturally gets more work out of the tractor. What's more, he gets it on the toughest, most demanding track-type jobs. Cat power shift design is strong and rugged for the *heaviest earthmoving duty*.

Get the details about this power shift from your Caterpillar Dealer. Ask for a demonstration—see for yourself how it steps up production. Remember, you also have your choice of direct drive or torque converter in the D9 or D8. Whatever the application, Caterpillar has the most productive machine for it!

HIGHER PRODUCTION PUSHLOADING: *Power is quickly, easily adjusted to meet the demand. Shifting to higher gear boosts scraper out of cut at higher speed, increases production. Speedy reverse quickly positions machine for next push.*

CAT POWER SHIFT TRANSMISSION



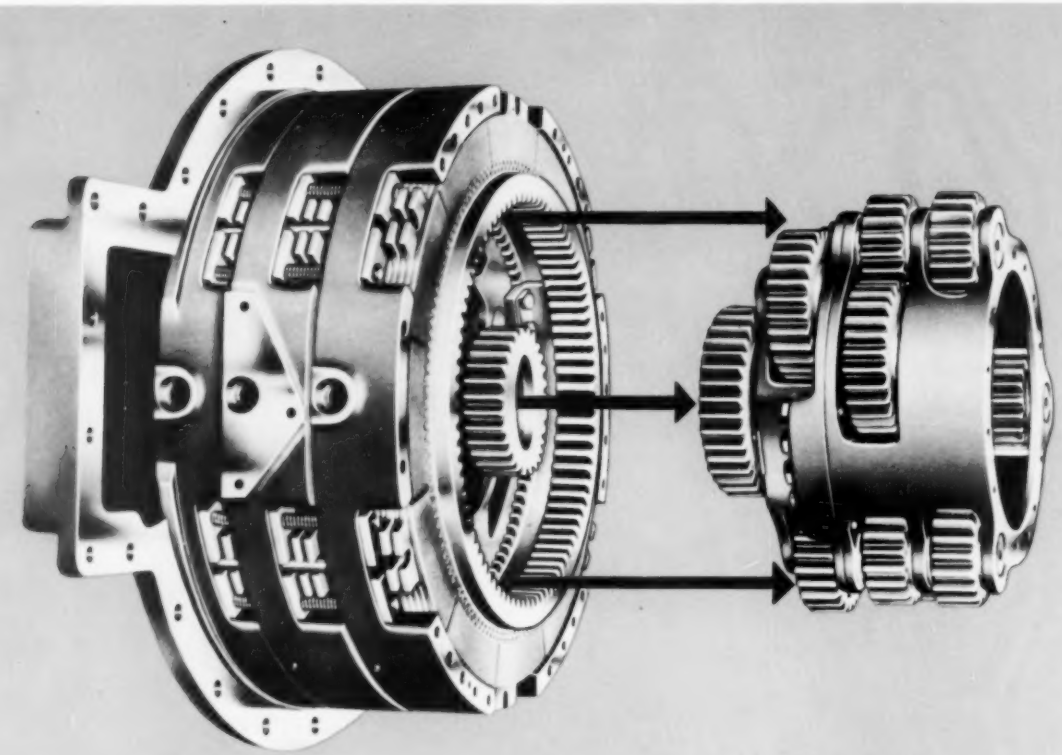
BASIC DESIGN: Total power is transmitted from the engine to a planetary gear arrangement mounted in the engine flywheel. The planetary divides and directs the total power — part goes through a direct drive shaft straight to the transmission and the remainder through a torque converter to the transmission. This enables the Cat power shift to combine some of the efficiency and the positive operating feel of direct drive with the anti-stall and flexibility features of torque converter drive.

Power shift control is mounted to the left of the operator (see previous pages). One selector lever (black knob) eliminates gearshift, forward-reverse and flywheel clutch levers. The safety lever (red knob) prevents accidental transmission engagement. The selector lever moves in a "U" path to various positions. To the left are three reverse speeds. To the right, three forward speeds. To change speed, simply move lever to the required position. To change travel direction, move lever to the opposite side. Changing speed and direction are as easy as that—without clutching—and changes can be made while the machine is in motion under full load without loss of power.

Pioneered by Caterpillar, this uniquely designed power shift is engineered and built for heavy earthmoving service—it's rugged! The transmission itself weighs over one ton! And its clean, unit construction design makes it easy to service, when required.

HIGHER PRODUCTION BULLDOZING: *As the material builds up, Cat power shift permits split-second, on-the-go shifting. There's no forward surge when the load is dropped. Instant reversing further slashes cycle time on a bulldozing assignment.*

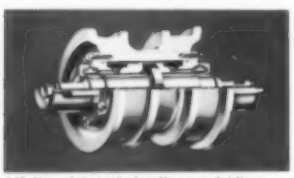
ONE TON OF RUGGEDNESS



—CAT POWER SHIFT TRANSMISSION!

You're looking at a portion of the components that make up the new Cat power shift transmission. This rugged transmission, weighing over a ton, is designed and built specifically by Caterpillar for its giant tractors. Every component is constructed for long-lived service. Selected alloy steel insures performance that stands up under the toughest conditions. Equally important, Cat power shift comes to you thoroughly tested by exacting design and demanding field work in the heaviest earthmoving duty. You can be sure that it will stay on the job.

In fact, every feature of D9 and D8 Tractors is specifically designed and built to keep these machines working *profitably* for you. For example, lifetime lubricated track rollers never require further lubrication until rebuilding. They feature Caterpillar-developed, *exclusive* floating-ring seals that assure constant, positive sealing. These seals—plus a rugged design featuring bushing-type bearings and deep hardenable alloy rims—plus 2½ million test hours—make Caterpillar rollers ready for the toughest jobs.



Lifetime lubricated rollers and idlers—one of many other rugged features of Cat D9 and D8 Tractors.

In short, nothing has been overlooked to make these modern, heavy-duty machines the most practical and most productive in their class in the field.

For complete facts on the new Cat power shift see your Caterpillar Dealer. He's ready to explain in detail how the Cat power shift works, or to demonstrate its ruggedness . . . its ease of operation . . . its productivity. Name the date—he'll demonstrate!

Caterpillar Tractor Co., Peoria, Ill.; San Francisco, Calif., U. S. A.

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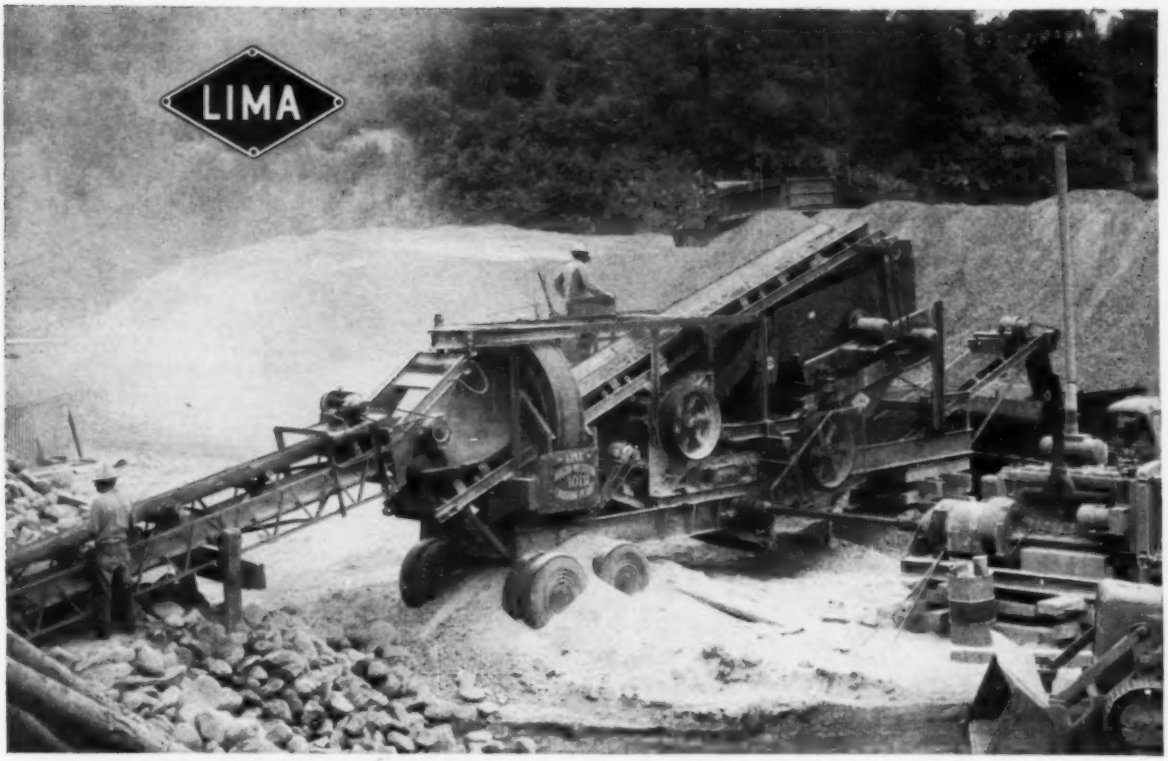

Lima Austin-Western 101-SE portable crushing and screening plant travels narrow mountain trails to reach such remote end-use site as this, where it produces high tonnage of low cost construction aggregate.

Portable Lima Austin-Western 101-SE crushes, screens 160 tons hourly for Colorado contractor

"There are many reasons why we like our Lima Austin-Western 101-SE portable crushing plant," says Dean McClellan, of Oliver & McClellan Construction, Cortez, Colo. "Features that have paid off especially well for us are portability, push button control and high production at low cost."

Portability a must

"In this part of the country, and in our operation particularly, portability is a must. We move our 101-SE in the mountains over nothing but Jeep trails. Yet we never worry about its upsetting.

"One-man push button electric operation is great, too. The operator sits where he can see the whole plant—he can control any operation all by himself.

"We are more than satisfied with the high production of our 101-SE. Colorado rock has a reputation for being mighty hard to crush. But with our crusher, it breaks up easily. On a recent job our 101-SE produced 1½ in. minus base material, in 70% crush, at an average rate of 160 tons per hour! In my book, that's good production," Mr. McClellan said.

Diesel, electric power

The 101-SE is a completely portable, rubber mounted, self-contained crushing and screening plant. Diesel engine drives crusher and generator, which powers all other operations. Electric drives eliminate troublesome clutches, chains, sprockets and gearboxes . . . simplify maintenance, help reduce cost per ton. Portable plant capacities range from 25 to over 200 tons per hour.

Keep pace with your cost and progress estimates . . . keep haul cost and time low. There is a high-speed, profit-making Lima Austin-Western plant, portable or stationary, exactly right for your needs. Send for all the facts and the name and address of your nearest distributor.

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Deep soaking of cut area in progress, in this instance on rough ground but without dozing terraces to create ponds.

Two water storage ponds were built where the pipeline reached the job. Pond in foreground supplied the prime contractor's water trucks.

Prescription:

BIG-SCALE PRE-WETTING AND RIPPING

Some shooting was done, too, for this mixed-strata project—but surprisingly little, considering. Pre-wetting was "best thing we have found," in words of project manager.

Nearly ten miles of pipeline, well pump and boosters, storage ponds, and exceptionally deep pre-soaking—result: moisture problem whipped, job grading on schedule, the contractor maybe making some money.

Wholesale ripping also made news on this Wyoming Interstate 80 project here reviewed. Taggart Construction Co. worked all the tricks.

The project is one of the "big ones" which reflects Wyoming state policy of letting 'em big enough to give today's high-production equipment its head: 3,269,000 cubic yards of roadway excavation the principal in two adjoining contracts for $1,540,000 contract extending over 7.7 miles of dual roadway on new location.

Two of the controlling elements were: (1) many kinds and combinations of rock, shale and earth, and (2) water where it wasn't wanted and vice versa.

Another controlling element was the need for speed. The contractor was given 280 working days. With a good late-1958 start and resumption this past April, the December deadline looks like a walk-in thanks to smart strategy in the use of a rather modest equipment outfit. A combination of really thorough, most scientific pre-wetting, all-out ripping, and judicious shooting did it. Although not detailed here, the tightly-managed preventive maintenance methods also contributed; downtime was a dirty word on this project.

Most of the yardage was in three big cuts; the highest 150 ft. at one end. Successive layers of sandstone, shale, sand and various soil classifications occurred at 2 to 4 ft. intervals. Most of the cuts were on steep side slopes which complicated the prewatering problem.

Preparatory Work. Cat dozers and a Euclid TS1 scraper did most of the pioneering. The purpose of the preparatory work was to strip all the vegetation and to do preliminary grading and terracing so that prewetting would be as effective as possible.

Pre-Wetting. All water for compaction purposes and haul road maintenance was subcontrated to Industrial Pipe-Lines, Inc., of Holdredge, Nebraska. The subcontractor used 9.5 miles of aluminum pipe to bring water from the Bear River, near Evanston, to the project. Six pumps raised water over a distance of four miles in this line; the head reached 1200 ft. maximum at one point in the project. The water contractor used a formula involving pressure losses due to pipe friction and head to determine the location of his five booster stations. In general initial pressure was 180 psi at the pump, dropping to 5 psi at each booster station where 180 psi was restored.

The primary station consisted of Layne Verti-Line deep well pump, driven by a Chrysler industrial engine with U.S. Motors Holloshaft gear drive.

PRE – WETTING AND RIPPING

Engine fuel was bottled propane (warm weather), cold weather) or, butane. In discussing the use of these fuels, Duane Peterson, of Industrial Pipelines, cited two distant advantages. These fuels are hard to steal, "They don't walk away in pails" to quote Peterson. And they contribute to high engine life.

The main water line consisted of 6-in. aluminum pipe with McDowell couplers, fittings, and valves, Industrial Pipe-Lines buys aluminum tubbing from producers and has the pipe fabricated to its own specifications. The supply line was patrolled frequently.

Industrial Pipe-Lines standardized on Gorman-Rupp pumps for booster stations. These centrifugal pumps were rated at 500 gal. at 500 ft. of head. Careful preventive maintenance played an important part keeping the booster pumps operating. It was practice to change the engine oil and filters every 100 hours.

A major job-element was the on-the-job water storage and facilities supplying the water trucks. Two large storage ponds were built near the west end. The first, strictly for the water subcontractor's storage, was equipped with a booster to pump water to the job. The farther pond was for the prime contractor's use; whenever replenishment was necessary, a valve was opened from the main line and the flow allowed to run into the second pond.

Several factors entered into the measuring of the water delivered to the project. Taggart had two 2,000-gal. and two 3,600-gal. semi-trailer tankers. Their consumption was measured by load count. All other water pumped to the job was measured with Sparling meters.

Any run-off or wastage of water was deducted from the total metered gallons pumped to the project. To determine the deduction for wastage, the state engineers selected a place where such run-off was concentrated and used a 5-gal. bucket and a stopwatch to determine the rate of flow. This deduction by the state for wasted water provided a powerful incentive to make the greatest possible utilization of water.

Pre-wetting of material handled to maintain optimum moisture during the grading was done entirely by the sprinkler system method. Prior to wetting, cuts were carefully prepared to reduce water wastage to a minimum. Vegetation was stripped, the area thoroughly cross rooted on about 5-ft. centers, and ponding terraces either bulldozed or graded in. Normally stripping and ponding terraces are *not* standard procedure before prewetting, but due to the type of vegetation and terrain on this job it was advisable to do so.

D8 and D9 dozers alternated for both ripping and push loading. Cat and Ateco rippers carried H & L shanks and points with JJ's on hand for special work.

A typical sprinkler installation consisted of a pressure valve, Sparlying meter and a suitable length of 8-in. manifold pipe equipped with McDowell valves. Five-inch laterals were taken off every 60 ft. to provide a complete coverage of the area to be pre-wetted. Rainbird No. 30 sprinklers were installed on 40-ft. centers. It was necessary to maintain 38 to 40 psi pressure at the manifold to insure proper sprinkler operation. Excessive pressure caused erratic water distribution.

It took the combined experience and cooperation of the state engineers and both contractors to maintain good control of the rate and amount of pre-wetting. Everyone connected with the project described this as a tough pre-wetting job. First there was the factor of terrain; the steep slopes tended to allow run-off to be excessive. The second factor was the long pumping distance and the possibility of breakdowns in such a system.

The factor which took the greatest control, however, was the highly varying of rock, sand and soil. One rule of thumb: 5 ft. of water penetration for every 24 hours of sprinkling up to a depth of 40 ft., provided no impervious strata were encountered. It was expected that the penetration rate would be considerably less below 40 ft. The existence of impervious strata would show up as excessive seepage along the cut edges. It would then be necessary to stop the pre-wetting until excavation had been carried to that depth. Two weeks was considered a minimum time for curing out after pre-wetting.

Del Benson, superintendent for Taggart, said that his experience showed proper curing to have two advantages. First, there was a uniform wetting of the soil which ruled out dry pockets and hard dry clods. Secondly, moisture stored in the soil would tend to continue to penetrate and keep somewhat ahead of the excavation.

The use of explosives was an important part of pre-wetting where an impervious strata had been encountered. This blasting served two purposes. It shattered the underlying strata which made it possible to do a more thorough job of pre-wetting. And it broke the hard material into chunk sizes which could be better handled with the scraper equipment.

Drilling for this job was done by a Joy unit with T450 hammer and 3.5-in. Joy tungsten carbide bits. For compressed air a Worthington 315 was coupled with a Chicago

Pumping station at river nearest the job—Layne Verti-Line deep well pump, Chrysler engine driven.

Sprinkler take-off, using McDowell couplers and valves. Part of equipment of the water subcontractor.

Metering installation for prewetting sprinklers. Sparling meter just ahead of 8-in. manifold. Pressure gauge at left beyond picture.

Compaction team for one of the spreads: Southwest 75-tonner and G552S Bros sheepsfoot.

Pneumatic 365. Hole production averaged 90 to 100 ft. per hour.

The explosives were all DuPont products. Electric delay caps and 40 percent primer were used to detonate ammonium nitrate. The nitrate was treated with diesel fuel on the job at the rate of about 0.8 gal. per 80-lb. bag. The procedure was to stand a bag of ammonium nitrate in a container, open the top and then pour on all of the diesel fuel which the ammonium nitrate would take up. The run-off was collected for future use.

A 20-ft. hole was loaded with about 70 lb. of explosives. About 2 lb. of explosive was required per cu. yd. of production, ledge measure.

After blasting, the pre-wetting operation was repeated until it was estimated that the material in the full depth of the cut had sufficient moisture to assure proper compaction when placed in the fills.

The degree of the pre-wetting was not left entirely to experience. Random auger samples were taken periodically during pre-wetting and submitted to the state testing laboratory on the job for a moisture analysis. This analysis was effective in reducing the wastage of water and in insuring ample pre-wetting.

The water contractor made it a standard practice to collect and reuse all run-off water wherever possible. This operation usually consisted of bulldozing a small pond in the appropriate area and the installation of another booster outfit.

In discussing the operations of Industrial Pipe-Lines, Duane Peterson brought out several interesting points. This company got its start in the water producing business in 1951 while working with Western Contracting Co. on the Oahe Dam in South Dakota and Perry McLone Co. on 17 mi. railroad relocation at Trenton, Nebr. The specialist firm's business had expanded until they have had more business than their available pipe could handle.

The company's general practice is to drill its own wells whenever possible. Pumping has gone as deep as 700 ft. Among the major complications of the business is the negotiation with land owners for drilling or securing water rights.

Pre-wetting is not without its occupational hazards, according to Peterson. The cool pipe and sprinkler systems attract so many rattlesnakes that anti-venom kits are carried on all water service vehicles. (Pre-wetting also brings swarms of mosquitoes.)

Earthmoving Operations. The extent to which the contractor used pre-wetting in preparation for scraper operations has been described, but even more spectacular was the extensive use of rippers and dozers. Briefly stated, the policy was:

Push every piece of equipment to its "absolute utmost" capacity.

Expect a high repair cost per hour of operation—while at the same time reducing the maintenance cost as much as possible by careful scheduling of preventive maintenance.

The contractor had 11 primary earthmoving units on the project. The goal was to keep at least 9 of these in operation at any given time. The following equipment resulted in a good balance for the operation on this particular project. There were 6 Cat DW20s, 2 DW21s, 2 Euclid 14s and 1 Euclid Ts1. The contractor also had 1 Cat 80 pull scraper for miscellaneous operations. Three Cat 12 motor graders and a Northwest 25 dragline completed the major earthmoving items.

All of the Caterpillar scrapers had been lengthened out 1 ft. and sideboarded. This modification of the scrapers was carried out by the Wheeler Machinery Co., of Salt Lake City, using Peterson kits, at a cost of $5,000 each. This modification increased the capacity of the

Cat 456 scrapers from a normal 18 to 27 cu. yd. The normal 27 cu. yd. units were increased to 32 cu. yd.; payloads on the scales sometimes weighed as much as 86,000 lb.

The contractor estimated his daily production on the basis of a load count, using 17 cu. yd. straight through for each haul unit. A service of the Caterpillar Co. to the contractor was the periodic weighing of the loaded units to determine whether or not the figure of 17 cu. yd. was accurate.

The practice was to divide the available units into two spreads of 4 or 5 haulers each. Working with each spread was 1 Cat D8 and 1 Cat D9, both equipped with heavy-duty hydraulic rippers. These tractors alternated between pushing and ripping according to the situation.

The tactics when a rock strata was encountered was for the rippers to do their utmost to dislodge any and all rocks which could be loosened in this manner. After the rock was fairly well uncovered the operators used their dozers "against the grain" to up-end such big rocks as they were not able to rip.

For the most part operators ripped parallel to the center line of the cut, but after a time this developed hard ridges in the subgrade. As soon as these ridges became troublesome, the operators cross-ripped the area, which removed the ridges and grooves completely.

Most of the loosened rocks could be scraper-hauled. The DW21s proved best equipped for this operation, due to their short turning radius. A scraper would come alongside a large rock and turn sharply as soon as the tractor wheels had passed, giving the blade a clear try at the rock. In this manner the large rock was worked into the scraper unit which was then push-filled with other earth and rock. Whenever a rock too big to be scraper-hauled was encountered, one of the dozers pushed the rock down the hill into the fill.

Wherever possible the two spreads were worked on separate cuts under the same foreman. Wherever the two spreads worked together, the contractor attempted to establish a separate haul road for each spread. The general plan was to take both edges of the cut down to haul road depth and then have the two outfits take out the middle by working toward the center.

There was an intense competition between the two shifts, which resulted in increased production. To move 9,000 cu. yd. per shift was considered ordinary production for the job conditions. The crews often made 11,000 to 12,000 cu. yd. per 8-hour shift.

Compaction. The two adjoining contracts were among the last to be let by the Wyoming state highway department before it adopted the end-result specification. There were separate bid items for water and rolling time. Compaction for each spread was accomplished by team of a super-compactor and a sheepsfoot. The super-compactors consisted of a Tampo 50 ton and a Southwest 75 ton. The sheepsfoot units were Bros G552S's.

Specifications required 90 percent of AASHO standard desity for embankment and cut bottoms. The effectiveness of the pre-wetting and the rolling was such that compaction involved no special trouble. Many tests ran 93 percent, some exceeded 100 percent.

Pre-wetting required an average of 28 gal. per cu. yd. of water addition to secure the 15 percent optimum moisture during compaction. In most instances good results were achieved at anything from 80 to 100 percent of optimum.

Of concern to both the engineer and the contractor was the existence of springs and subsurface moisture underlying some of the deeper fills. The major portion of one deep fill subsided 7 ft. due to subgrade saturation from an unsuspected spring. In this instance most of the damaged fill was removed as well as about a 25 ft. depth of the saturated subgrade. Perforated CMP in granular backfill was prescribed.

Wherever subsurface moisture was suspected, perforated CMP was

(Continued on page 94)

Competition between day and night shift spurred production. Thermometer scoreboard was timekeeper's responsibility. It often got close to the top.

Cat DW21 turn-loads a big rock easily, is then push loaded to capacity.

Telescopic photo shot catches debris and mat on the rise. Mat blown off ground, but debris is well contained.

Fractional-Stick Shooting Speeds Curb Removal

By William F. Hallstead

It was slow going with the jackhammers. The curb concrete was extremely hard—so tough that the Baltimore roadbuilder's crew was able to break up only 50 feet of it in two days.

At this point the contractor took a good look and subbed the job to a local dynamiting firm that has achieved national recognition in the efficient use of explosives in tight situations. Here are some of the ensuing details.

The over-all project was the improvement of a portion of Eastern Boulevard southeast of Baltimore, Maryland. The stretch of 4-lane highway borders the vast Martin Company. At Wilson Point Road, which traverses the Martin Plant grounds, the intersection was being rechannelized. This rechannelization called for the removal of 300 ft. of concrete curbing that served as an existing median.

This curbing had 18 in. base width and about 12 in. height. It was not reinforced, but the material was extremely hard. Test shots made by the blasting company showed that 10-in.-deep holes on 24-in. centers would provide good breakage at max-

Wiring is completed for 4-charge shot as Gradall swings mat into position. Three-man team loaded, covered and fired four holes every six minutes.

Powder man and assistant tamp sand in a blast hole. In background, fractured curb seen extending back to group of workmen.

Trench remaining after debris cleared. Pavement adjacent is intact, yet curb was completely shattered by more than 25 separate detonations.

imum spacing, when each 1½-in. bore hole was loaded with ¼-stick of Du Pont 40 percent Special Gelatin. The entire curb was then drilled down its center-line with vertical bore holes on the 24-in. spacing.

The holes were fired in groups of four, one-fourth stick in each, all four holes primed with instant caps. Cover was provided by one 12′ x 12′ one-ton ⅝-in. cable blasting mat, placed by a Warner & Swasey Gradall. The mat served to block the larger debris. Small particles did get through, but fell only a few feet distant. Heavy traffic in both directions was interrupted only during actual shooting.

Paralleling the blasting site, and some 150 ft. distant, were the tracks of the Pennsylvania RR main line to Wilmington and Philadelphia. Rail traffic was not disturbed in any way in spite of the frequency of detonations: one shot every 6 minutes. With such efficient loading and firing, the curb was fractured at a timed rate of one foot per minute —excluding drilling time. The loading and firing were accomplished by one powder man, an assistant, and the Gradall with its operator. Where conventional methods had broken up only 50 ft. of the curb in two days, blashing removed 270 ft. in less than half that time.

The dynamiting sub-contractor was Burnbrae, Inc., Baltimore, Md. Prime contractor for the Maryland State Roads Commission was Harry T. Campbell Sons' Corporation, Baltimore.

Reinforced Concrete Paving to Be Studied

A basic and applied research project to study steel-reinforced concrete roads, the results of which are expected to lower the cost of road maintenance in Maryland, will be undertaken jointly by the state roads commission and the University of Maryland, in cooperation with the Federal Bureau of Public Roads.

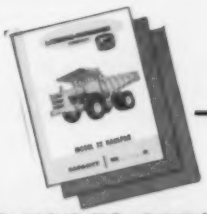
The study involving both laboratory and field research, still seek to establish a criterion for road design, thickness of pavement, and the amount of steel-reinforcement required to eliminate expansion and contraction joints.

Dr. C. T. G. Looney, head of the university's department of civil engineering will direct the project along with Dr. H. A. Lepper, Jr., professor of civil engineering, Norman M. Pritchett, chief engineer and Allan Lee, research engineer for the state roads commission.

Plans call for the construction of nine different experimental sections along five miles of the Baltimore-Harrisburg Expressway between Mt. Carmel Road and Middletown Road. The sections, now under construction, are built of concrete with varying amounts and patterns of steel-reinforcement.

In recent years allowance has been made in Maryland for expansion and contraction of pavement by placing transverse joints every 20 to 60 ft. The elimination of joints and their maintenance offers possibilities of cost savings, the university spokesman said, and is expected to give smoother riding pavements.

Research work in the field will be coordinated with the basic research in the university department laboratories, using research graduate assistants.



—— Make a "spec check"...

Compare Haulpak® ... see how

LW engineers "threw away the book" when they designed the new Haulpak off-road hauler... for *your* benefit. Some of the exclusive features that resulted are shown here. They are advantages that help you move *more* tonnage, *faster*, at *lower* net cost per ton.

To see what this advanced design approach means to Haulpak, check its specifications. You'll want "spec sheets" in your files anyway, and your LW Distributor can supply you copies. Then, with basic Haulpak facts handy, compare them to *other* off-road haulers.

WHAT YOU WILL FIND WHEN YOU COMPARE HAULPAK:

(Competitive hauler specifications are "averaged out" for simplicity purposes... but Haulpak superiority is just as clear over any *single* machine.)

WHAT TO COMPARE	Off-road Haulers 20-30-ton class		Off-road Haulers 30-40-ton class		HOW YOU BENEFIT
	Average*	Haulpak LW 27	Average*	Haulpak LW 32	
Length Wheelbase Turn Diameter	26'7" 14'4" 64'3"	23'10" 10'10" 44' 6"	31'5" 16'7" 77'6"	23'10" 10'10" 44' 6"	*HAULPAK is shorter.* You maneuver faster, quicker and in less space.
Top Speed (in mph)	30.7	35.4	25.2	38.8	*HAULPAK is faster,* for more cycles per hour, more tonnage per shift.
Empty Weight (in lb)	49,300	43,020	73,400	44,950	*HAULPAK is lighter,* for more payload weight, less "dead" weight.
Ground Clearance Front Axle Rear Axle	16" 16"	25" 20"	17¼" 18½"	25" 20"	*HAULPAK has higher clearance,* to minimize troublesome "dozing" action.
Brake Surface (sq inches)	1511	4680	1834	5148	*HAULPAK has bigger brakes,* for greater safety, more steady use of high speeds.

and here are some of the design features that make these HAULPAK advantages possible

(*Based on specifications available at time of printing)

All new . . . but Haulpak is already a *fully-proven* piece of equipment. Units worked for over 14 months on construction jobs, in mines, and in quarries, before the first Haulpak was put on the market. Exceptional results of these tests are now being duplicated all around the nation.

it can cut your haul costs

Hydrair* suspension...eliminates springs...permits higher clearance, shorter turns

Haulpak rides on air! 4 Hydrair units replace leaf springs. System cushions against loading and travel shock, reduces maintenance costs. Eliminates front axle, and compensates for off-center load. *COMPARE IT!*

"V"-shaped body...lets Haulpak outcarry trucks that are longer, higher, heavier

Bonus yardage in every Haulpak load rides in exclusive V-bottom of body. Slope also helps fill all corners for low-void payloads. "V" lowers center of gravity for better stability, traction, on grades. *COMPARE IT!*

Box-beam frame...3 times stronger, ⅓ lighter, carries 30% more payload weight

Strongest hauler body ever built. Floor and all wear-surfaces made of 10,000 psi steel, yet weighs 33% less than comparable bodies. Body is exhaust-heated. Haulpak hauls 30% more than its own total weight. *COMPARE IT!*

Available in 22, 27, and 32-ton capacities

PLUS: MINIMUM MAINTENANCE (entire lube-check, needed only at 500-hr intervals, consists of just 4 easy-to-reach grease fittings) . . . POWER-TRANSFER DIFFERENTIAL (famed Tournapull® feature which automatically transfers power to wheel on best footing when going is rough) . . . POWER-MISER FAN (cools with 20 to 25 less hp drain) . . . 100% RUBBER-MOUNTED BODY (absorbs impact and shock of loading) . . . FOUR SEPARATE BRAKING SYSTEMS (for fast stops with complete safety) . . . POSITIVE POWER STEER (for faster turning, easier handling) . . . SIMPLE SIX-GEAR FINAL DRIVE (compared to 12 or more usually standard) . . . BIG, ROOMY CAB (has many work-efficiency features).

*Trademark HP-2193-DC-2

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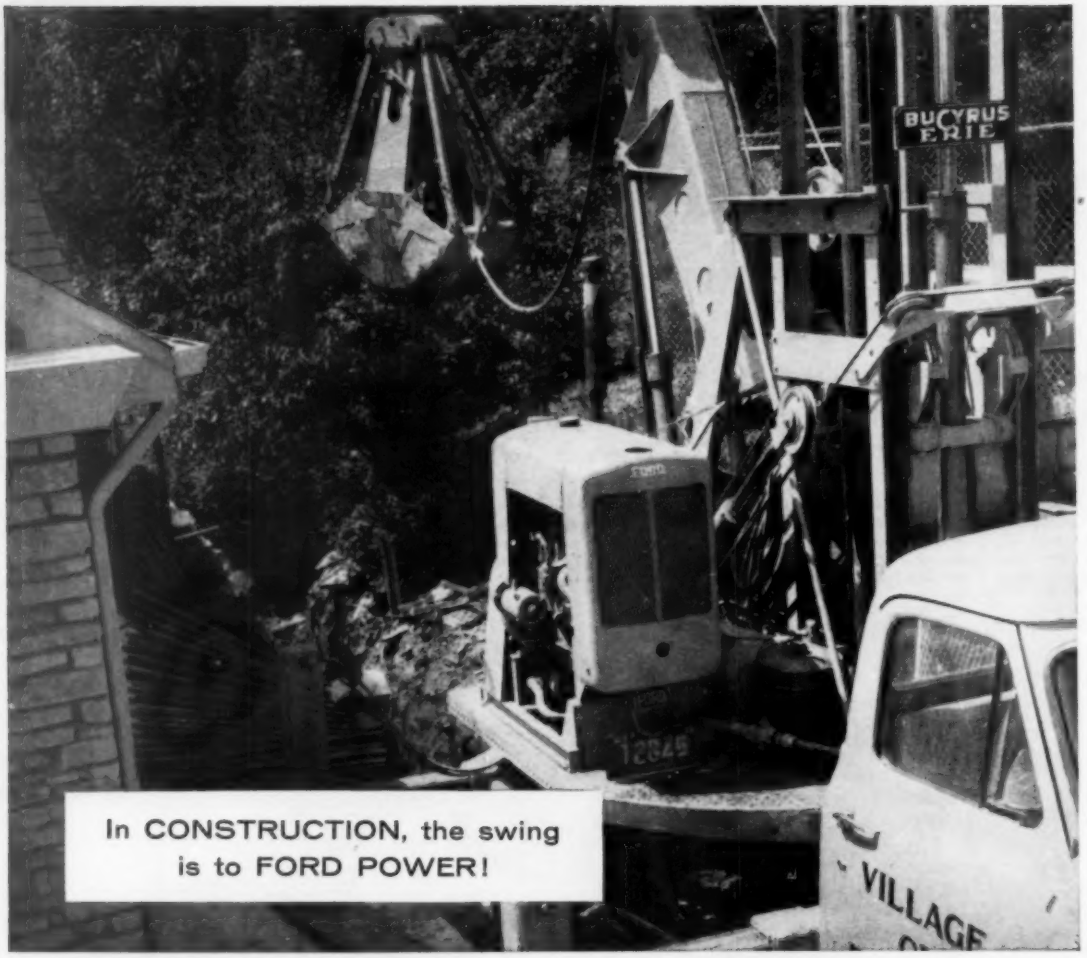
Where quality is a habit



WHY? Ford Engines are tough! Ford Service is everywhere!

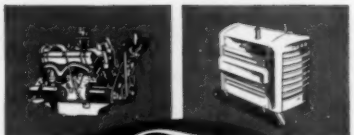
Ford Industrial Engines are becoming the solid favorite on construction jobs everywhere—primarily because of their many durability features.

You'll find, for example, that every Ford Engine has Short Stroke design that cuts engine friction, reduces wear . . . deep-block construction that minimizes vibration, lengthens bearing life . . . and overhead-valve design for greater operating efficiency and economy.

Ford Engines range from 134 to 534 cubic inches . . . including two modern Ford Diesels and three Super Heavy Duty V-8's—*all* available as power units or complete engine assemblies. To meet special fuel needs, gasoline engines can be adapted to LP- or natural gas.

As a Ford power user you need never concern yourself about costly downtime . . . for there's always a Ford Dealer nearby to give you the service you need *when you need it.*

Little wonder more and more profit-minded operators are swinging to Ford every day. For original installation or re-powering, specify Ford Industrial Power.



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Faster Scraper Cycles?

Look Into High Speed Final Drives

In one typical analysis, 23 percent more top speed is obtainable with nearly as much rimpull as you get with standard final drive. But your haul roads, brother, must be good.

High speed final drive gears in two-wheel tractor-scrapers, available from equipment manufacturers, will effectively cut overall cycle time.

So reminds Caterpillar Tractor Co., with the added proviso: "*If* there are long hauls, and the haul roads are in good shape."

The greater speeds available with optional gears —up to 23 percent faster in some cases—can mean greater productivity and lower cost per cu. yd. of dirt moved. The higher speeds are possible without an appreciable sacrifice in rimpull, transmission gear steps or acceleration.

The high speed gears should be used only if the top speeds they make possible can be fully utilized. "Ground Rules" in considering using them are:

Haul roads must be in condition to permit high speeds.

2. Total resistance (grade plus rolling resistance) should not generaly exceed 120 lb./ton.

3. Haul distance must be great enough to permit the high speeds to be reached and held long enough to result in a lower cycle time.

Field testing by Caterpillar Tractor Co. indicates that haul roads must be at least 2,000 ft. long, before the high speed final drives will result in significant cycle time reductions. Recent studies indicate that 44 percent of the two-wheel tractor-scraper units in service are working on hauls of 2,000 or more ft.

Although optional final drive gears have been available for several years, it is only recently that they have been considered as suitable for any but a limited number of applications. One reason for this was the generally poor haul road conditions common until recent times.

Today's higher horsepower machines have increased rimpulls at higher speeds. The result is that wheel tractors are now able to work at high speeds with more than adequate rimpulls over a wide range of job conditions.

Over the past 10 years, the speed of tractor-scraper units as a group has been increased an average of 10 MPH. During the same period, the overall productivity of these units has also climbed since the scraper capacities either held constant or were increased.

The improved tractor performance has resulted primarily from increases in the horsepower to weight ratio, safer and more dependable steering,

With High Speed Final Drives

Gear	MPH	Pounds Rimpull	Maximum Rimpull
1st	3.2	31,330	39,565
2nd	6.1	16,175	20,530
3rd	10.0	9,890	12,480
4th	17.0	5,825	7,375
5th	27.9	3,545	4,490
Rev.	4.1	.....	.....

With Standard Final Drives

Gear	MPH	Pounds Rimpull	Maximum Rimpull
1st	2.6	38,670	49,100
2nd	5.0	20,000	25,390
3rd	8.1	12,190	15,465
4th	13.8	7,185	9,115
5th	22.6	4,375	5,550
Rev.	3.3	.....	.....

How Are Your Haul Roads?

As every earthmoving contractor knows, the biggest variable in his highway grading jobs is apt to be the hauling. Some jobs have longer hauls than other; some rougher, steeper going. Some have wet, spongy material under foot. Others have hard packing dirt and gravel.

The fellow who hauls fastest gets the best season's production, gets to the next job sooner, shows lower costs and better profits.

As the accompanying review from a manufacturer notes, high speed final drives—now available on most tractor-scraper models—are more often applicable today. This is due in part to the higher horsepower, in part to mechanical refinements.

The need for good haul roads is also mentioned, and here is where we would like to add a word. It is a strange thing to see contractors with huge profits at stake allowing their foreman and operators to get by with less-than-good-enough haul road conditions. Yet this is a common sight. You can see it every day. Scrapers slowing down to maneuver bouncy grades. Spongy, poorly consolidated haulways that soak up horsepower and eat fuel like an invisible adverse grade.

The excuse may be that the blade operator has other work to do, or that the second blade needed to keep the haul road in shape had to go to another location. Or, just "the scrapers are placing the stuff so fast we can't keep up."

There are times when a temporary slow-down in the scraper cycle is still the cheapest solution to a short-term problem of over-all job (or jobs) management and equipment deployment. But we have been advised by experienced analysts that the haul road is the great neglected element in job planning and control.—The Editors.

---

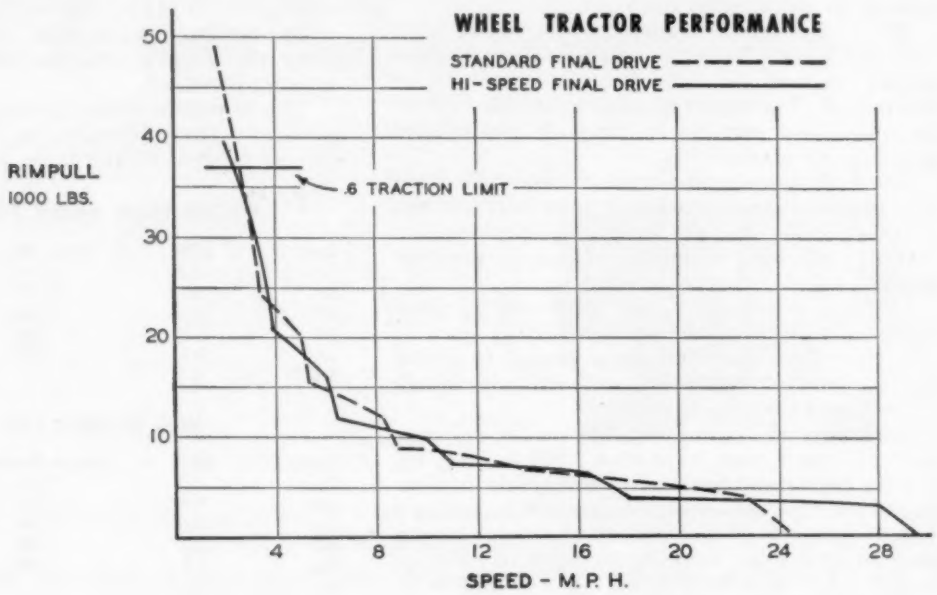
better tires and better braking.

But, the high-potential of these improved units could not have been realized if contractors as a group had not improved job conditions. With the advent of larger motor graders and longer average hauls, good haul roads have, however, been established as a prerequisite for economical earthmoving.

These improvements in turn have led to demands on the part of contractors for ever bigger and more powerful, high production equipment designed to fit varying job conditions. The optional final drive gears are an example of manufacturers' response to these demands.

The accompanying chart is for a typical high speed final drive gear arrangement. It shows that a unit equipped with these gears has rimpull adequate for a variety of job conditions along with the advantage of high speeds.

From these comparisons it is readily seen that the standard gearing offers higher available rimpulls in each gear range while the optional final drive gears have the higher speeds without a serious lack of rimpull. On this particular example, the high speed gears give a 23 percent faster top speed while maintaining 81 percent of the rimpull in first gear.



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GENERAL TRUCK TIRES

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Specify GENERALS on your new equipment

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East of interchange, US 40 (upper right) was widened and straightened. Contractor's Fruehauf trailer offices, repair facilities and fueling dock front on US 6, lower left.

Sixty-foot lifter holes were drilled below highscaling drillers. Foreground is Gardner-Denver—rear, Ingersoll-Rand.

Rock Methods for Canyon Interstate Road

How H-E Lowdermilk made extraordinary use of men, machines and explosives to open up a job described as "one of meanest."

It took a real mountaineering outfit to tackle this new highway through Colorado's Clear Creek Canyon area.

The project is along merged US 40 and US 6 where two busy trans-continental routes join, 30 miles west of Denver. The job was only 4,500 feet long, but in that short distance over 600,000 cubic yards of rock had to be moved in the midst of handling traffic and building two major creek crossings.

The 60 degree and steeper walls here made a problem for the locaters as well as the contractor. The geometric design difficulties in carrying a dual Interstate roadway (US 40 route) through this junction represent another story. This review tells how the low bidder, H-E Lowdermilk of Denver and New Mexico, handled the early-phase rock drilling and blasting and covers some of the related setup.

The photos and sketches will help the reader understand the contractor's over-all situation. US 6 and US 40 come out of separate canyons from the

(Continued on page 84)

After blasting the bench, high scalers are loosening dangerous rocks while a D8 dozes space for drill rigs.

Giant Series

New power! New design! New features! Plus a new drive option—Cat power shift transmission! The result: higher production on any application!

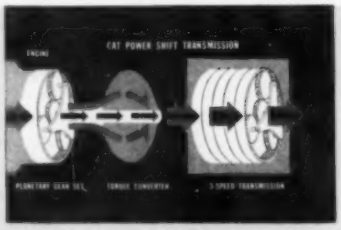
Now the "King of the Crawlers" is better than ever with new pace-setting capacity for higher, faster, lower-cost production on *any* big tractor application!

The biggest "new look" in the giant D9 Series E is the undercarriage. It's more massive . . . more rugged than ever. It'll add hours of life to running gear on even the toughest jobs. *Every* track component is new in design, highlighted by a big, new link—its pitch is increased 1¼" to 10¼"! And a new Caterpillar-developed steel alloy strengthens links, shoes, rollers *up to 40%!*

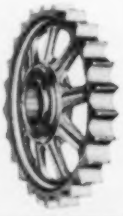
That's not all: the new D9 packs more power—335 HP. Its new equalizer bar gives greater stability on any terrain for greater operator confidence and production. A wider seat with a new spring-loaded adjustment mechanism makes the operator more comfortable, more efficient. No detail has been overlooked to make the new D9 handle heavier loads faster—and at lower operating and maintenance costs than ever.

And that's not all. Now, along with direct drive and torque converter, you have your choice of the new Cat

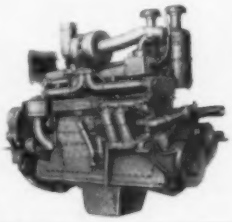
Dry-type air cleaner. Removes at least 99.8% of all dirt from intake air during every service hour. Can be serviced in 5 minutes. Reduces maintenance time and cost.



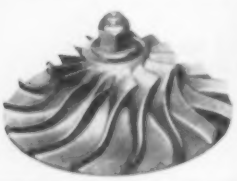
Exclusive feature. A planetary gear set splits the power from the engine. Part goes directly to the 3-speed transmission, the rest goes through a torque converter to transmission.



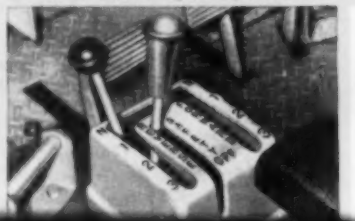
New sprocket. Sprocket is strengthened by new design with increased tooth thickness. Hunting tooth action provides slower wear rate.



New 335 HP. More powerful than ever, the D9's Turbocharged Engine has the capacity to handle bigger loads faster, with dependability, economy.

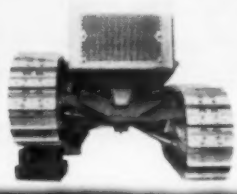


New Turbocharger. New, compact turbocharger packs more air into the engine. Open impeller wheel (shown below) helps prevent dirt build-up.



New power shift transmission. Optional on the D9. With this development you can shift **on-the-go** under **full** load with **one** lever and **no** clutching in a split second!

New, bigger, more rugged undercarriage. Major improvements in all track components add hundreds of hours of life to running gear—hours that mean more time on the job.



New equalizer bar. Greater stability. The rocking action of the bar shifts more weight to the up-hill track.

new CAT D9 E Tractor

power shift transmission. This revolutionary transmission, tested under the most rugged conditions, combines for the *first* time the positive feel of direct drive with the flexibility and anti-stall features of torque converter. With one control lever and no clutching, it reverses direction . . . changes speed . . . smoothly . . . under full load . . . in a split second!

Many of the new features, along with some familiar retained features, are shown here. Look them over. They'll give you an idea *why* the new D9 can mean higher production and more profits for you. For complete facts, see your Caterpillar Dealer. Ask for a demonstration and watch this giant eat up the work!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR'S **No. 1** PROJECT

CATERPILLAR'S NUMBER ONE PROJECT A multimillion-dollar research and development program — to meet the continuing challenge of the greatest construction era in history with the most productive earthmoving machines ever developed.

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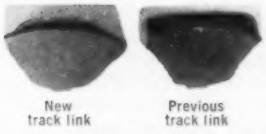
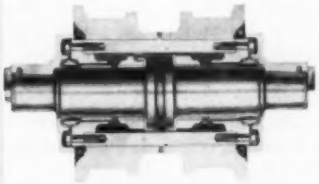
NEW D9 SERIES E— BORN OF RESEARCH PROVED IN THE FIELD



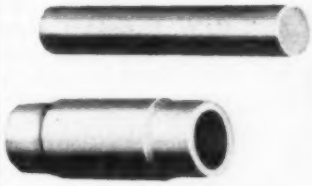
New track link — Previous track link

Light area at top indicates depth of hardening

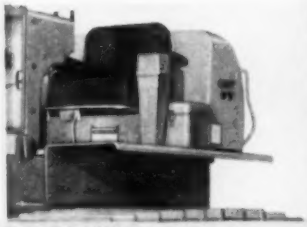
New deep hardening steel. Caterpillar-developed steel alloy (plus more steel in stress areas) gives up to 40% longer life to track shoes, links and rollers.



Lifetime lubricated track rollers. Lifetime lubrication eliminates servicing problems. Oil is retained by dirt-proof, floating-ring seals.



Larger pins and bushings. Diameters are ¼" larger. Increased size reduces deflection and provides better contact along the length of the wear surfaces.

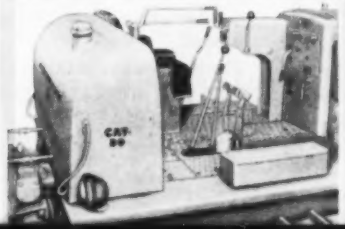


New seat adjustment. New spring-loaded adjustment mechanism provides more positive cushion and back rest positioning. Wider seat for more comfort.

Better visibility. Redesigned fuel tank gives better visibility to the rear and tapered hood offers unexcelled forward vision.

Stronger track shoes. New alloy permits deeper hardening in wear areas. Grouser height is increased ⅜" for better penetration and prolonged service life.

New foot decelerator. Provides easier machine positioning. Allows deceleration without taking hands from controls (optional on direct drive, standard on others).



Bigger, heavier track links. Strength has been added in stress areas. Pitch increase from 9" to 10¼" strengthens all track components.

1. Shown here is a prestressed concrete pile that was driven to just above ground and an additional section spliced on. A horizontal load was applied to the top of the new section in a manner that created maximum moment at the splice. Failure occurred not at the splice but below it.

2. Workman is shown lining up pile to be spliced onto one already driven into ground. Note metal jig around top of driven pile with side vents for pouring quick-setting Florok's plasticized cement. Everything needed is at job site.

3. After addition has been set in place and properly aligned, heated Florok's cement (it melts to a light fluid consistency between 265 F and 290 F) is poured into side vents of metal jig. In fifteen minutes jig can be removed and work resumed.

QUICK SPLICING NOW ADDS TO THE ADVANTAGES OF PRESTRESSED CONCRETE PILES

Now a new splicing method—developed by C. W. Blakeslee Company, New Haven, Conn.—adds to the already manifold benefits offered by high-strength, low-cost prestressed concrete piles. This unique, on-the-job technique increases the field of application at minor cost. For example, on jobs where the depth required to reach the specified load-bearing capacity cannot be predetermined accurately and/or where pile length may vary, it is now a simple matter to achieve the required pile length by splicing and continuing to drive. Materials cost for a 12″ x 12″ square pile splice is less than $2.00 and labor time within two man-hours. Driving can be resumed fifteen minutes after the splicing compound is poured.

The impressive qualities of prestressed concrete piles include: 1. Their ability to withstand extremely difficult driving conditions (far above the capabilities of reinforced piles). 2. Their transportability from fabricating yard to job site. 3. Their durability in sea water; being crackless they are virtually indestructible in all kinds of water. 4. Their greater column capacity over reinforced piles. 5. Their foot-for-foot economy. Complete details on prestressed concrete piles and the quick splicing method are immediately available. Write for them—and for information on tensioning elements for prestressed concrete—to Roebling Construction Materials, Trenton 2, New Jersey.

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A 40 gal. gas tank keeps the SP-54B working a full shift without refueling stops. High travel speeds to 20 MPH cuts time traveling between rolling jobs.

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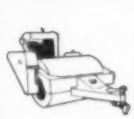

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Looking up at 45 degrees, four drill crews are seen—two on left are suspended by ropes.

CANYON "I" ROAD

(Continued from page 77)

east. They join for a time in a scenic setting famed among tourists.

Lowdermilk's $1,298,000 contract for a package job including the two bridges had these chief quantities: 601,000 cu. yd. unclassified excavation, 645,500 cu. yd. compaction, 3,780 M gal. of wetting, 10,540 tons plant mix asphaltic concrete, 16,500 tons gravel, 680 tons 85-100 penetration asphalt, 32,600 gal. MC asphalt prime, 4,700 gal. RC asphalt, 1,476 cu. yd. class A concrete, 265,000 lb. reinforcing steel, and 744,500 lb. structural steel.

Lowdermilk commenced work February 9, 1959, and expects to be finished about November 1. Liquidated damages of $200 per day were originally set to start September 1, but this clause was waived due to weather and unforeseen job difficulties, and extensions given to November 1.

Benching. The first problem was to get some reasonably level working area on this steeply tilted project. It was obviously impossible for dozers or crawler drill rigs to work on the steep slopes. Men, using hand drills, had to do most of the bench drilling. Mountain climbing tactics got the men and equipment into place, where they worked most of the time suspended by ropes.

The basic strategy was a high scaling operation for the crews drilling the down holes, and drill rigs for the lifter holes. Since the canyon widened out at both ends of the project, the ends offered the easiest places to start. The first blasting was to establish a narrow bench to allow the drill rigs to place lifter holes below the jackhammer crews, and to let the shovels get a toehold. Once the narrow bench was established the jackhammer crews started drilling from the top of the cut on down.

The jackhammer crews drilled vertical holes to a maximum depth of 20 ft. Lifter holes were drilled horizontally up to 60 ft. The rock formation and the slope of the cut governed the depth and location of the holes which were usually on 7-ft. centers.

Air was supplied by 4-in. Alcoa aluminum pipe and Wade Quick-Lock couplers. Four Gardner-Denver 600 compressors were in constant use. Jackhammer drilling was done with G-D 1-in. hex steel, mostly 2 ft. changes up to 20-ft. lengths using Timken 2¾-in. carbide insert bits. Bits were sharpened on the job (report on this to follow).

Three drill rigs and two compressors seen on bench with D9 in background. Original steepness of mountainside shows at end of bench.

Working below were two Gardner-Denver Air Tracs, with D123 hammers (one a brand new 10-ft. feed), and two Ingersoll-Rand Crawl IR's, the latter with D45 hammers, JG60 steel and Timken 2¾" tungsten carbide insert bits.

Drill foreman Furgeson estimated direct cost of bench drilling at 35 cents per cu. yd. as compared to 25 cents after the bench was established. The faulted nature of the rock and the extreme dip of the strata complicated both drilling and blasting.

Two Northwest 80D shovels loaded the bench rock, whenever possible directly into Euclid rear-dump trucks. Cat D8s and D9s on hand served two purposes. They continually dozed rock to where it could be easily reached by the shovels and at the same time leveled the bench floor for the drill rigs. Some rock was shovel-loaded on the bench. Most was dozed over the side to be loaded below.

Wherever the original bench blasting left humps in the bench floor, these humps were drilled and shot to keep the floor as uniform as possible.

Working on-the-Level. Once a wide enough bench was shot off to the backslope, drilling and blasting operations followed more normal procedures. Even then there were problems: the drill holes could be hard to find after they had been worked over by adjacent benching operations and many of the holes "made water." Holes were marked and protected from plugging by small pine boughs. As soon as a hole was drilled, a short pine bough was pushed into it with the stem down. These boughs effectively kept out debris and took but little searching to locate.

Wet-hole shooting was solved by the judicious use of DuPont's special gelatin. The accompanying drawing shows the usual loading of a wet hole. No gelatin was used in dry holes. The amount of gelatin in a wet hole was sufficient to top out above water level.

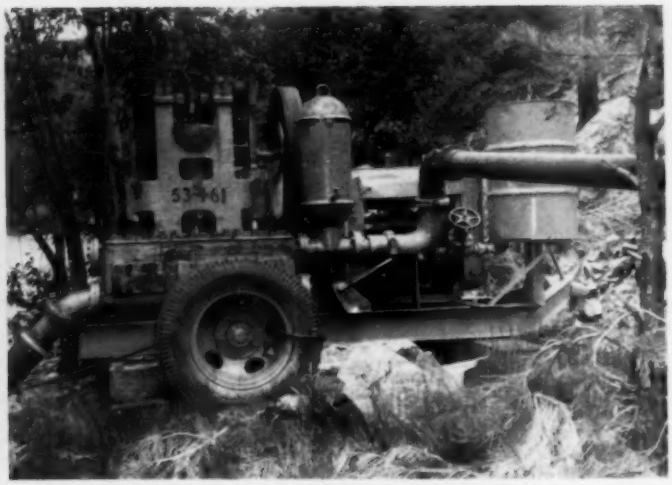
The contractor at this stage preferred to drill 30 to 35 ft. on 7-ft. centers wherever possible. Two 600 compressors and two drill rigs usually teamed up, once the bench was well established. Drilling averaged about 100 ft. per hour per drill.

The explosive workhorse on the job was DuPont Nitramite (ammonium nitrate). It was triggered with 45 percent nitro primer and DuPont instantaneous to No. 4 delay electric blasting caps. Use of about 75 lb. of Nitramite per 2¾" x 30' hole produced as much as 1 cu. yd. of rock (ledge measure) per ¾ lb. of explosives in good conditions, tough areas requiring up to 1½ lb.

Jackson M. Eberhart, powderman, liked to use Nitramite. He expressed satisfaction with its free running qualities and its safety record. It was Eberhart's opinion that misfires are almost entirely caused by carelessness. While he had found that Nitramite could be burned or dropped without apparant danger, he didn't recommend either practice. He found that Nitramite would not fire in a wet hole. In wet holes the primer and special gelatin fired leaving the wet Nitramite unexploded. Because of Nitramite's reluctance to explode, Eberhart felt there was practically no danger in redrilling in the area of such a misfire. He also expressed a liking that Nitramite was dated, none more than 30 days old on arrival.

Eberhart found that he got the best explosive yield by using instantaneous caps on the outer row

Northwest 80D shovel operator does ticklish highscaling while cleaning bench.



Deming 3-cylinder pump powered by a Continental Red Seal engine pumped against 300 ft. head job water supply.

of holes followed successively by No. 1s, 2s and 3s until the backslope was reached, where No. 4s were used. He commented favorably on DuPont's use of various colors to supplement the clearly printed delay number on each tag attached to the blasting caps.

The benching shots produced a few "whoppers" which had to be hand drilled and shot again. A tractor-mounted compressor supplied this drilling.

The Colorado end-result specification applied for the fill construction. Normal sheepsfoot rolling at optimum moisture proved adequate for the small proportion of the yardage where earth was involved.

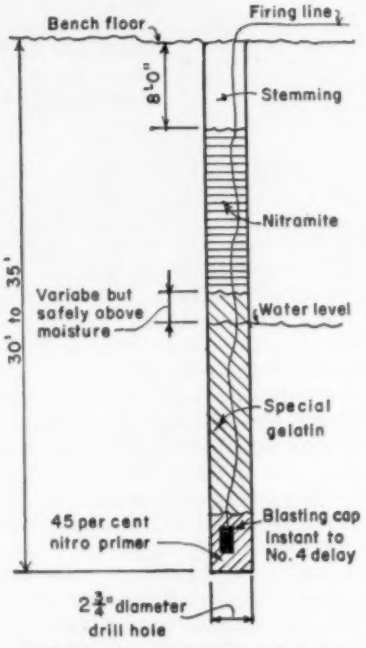
Traffic Handling. A chief delay in getting the rock work started was the fact that US 40 and 6 converged directly below the heaviest cut. To work this area it was first necessary to complete one major structure and the detour bridge, in order to get traffic moving on the far side of Clear Creek and the new juncture farther east. Concurrent with this was other heavy rock work in the widening and straightening of a short stretch of US 40 east of the junction. Traffic counts ran to 19,000 per day at peak periods during the work.

The new structure allowed US 6 traffic to cross Clear Creek east of the working area. It also joined one of the new US 40 lanes which resulted in an out-of-the-way juncture of the two highways. The merged traffic was then detoured under the old US 40 bridge leaving this bridge available as part of a haul road.

A temporary detour bridge on the west end enabled traffic to recross Clear Creek.

Flagmen were needed almost continually on the west end. The US 40 bridge overpassing the detour and a contractor-built underpass under the new US 40 reduced traffic handling problems greatly on the east end.

Water Supply. While Clear Creek afforded an ample supply of water, the contractor had to go



How blast holes were loaded during early benching work.

from one extreme to the other in providing loading facilities for the water trucks.

On the west end, gravity flow from a small tributary filled a large tank on the south side of Clear Creek, but the tank was inaccessible to the trucks. Water was piped across the stream in a 4-in. pipe which spanned 30 ft. This pipe was made self-supporting by welding structural members to it to form a truss. Except for installation costs, this water was "for free."

An accompanying photograph illustrates the situation at the east end. Water had to be raised

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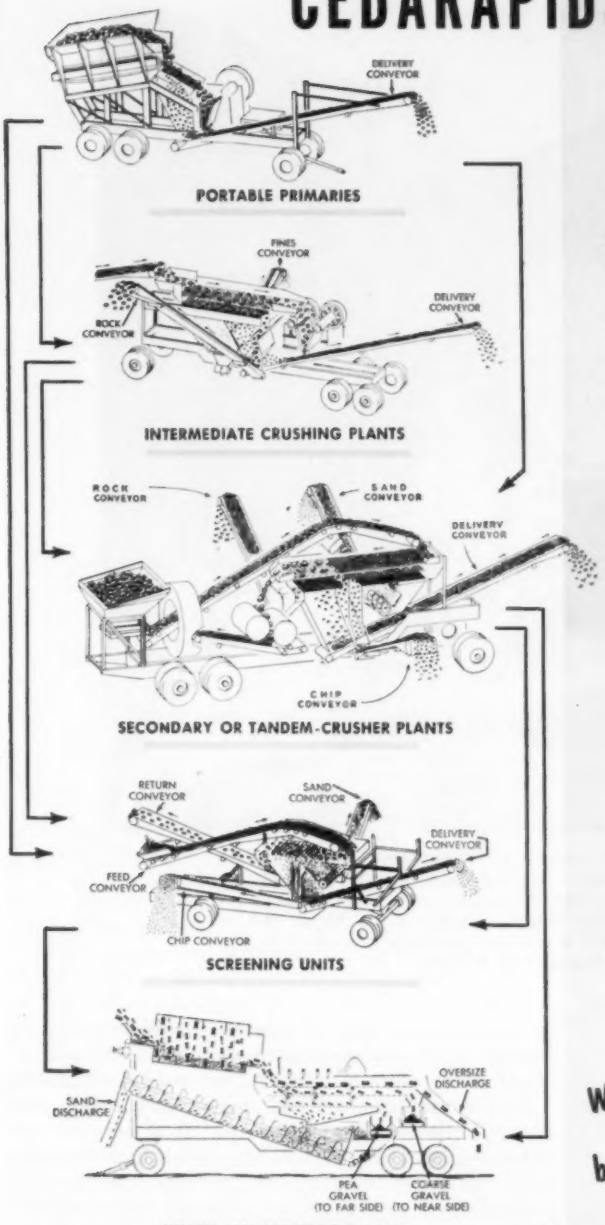

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The drawings at the left indicate the basic units that make up a Cedarapids Unitized Plant, with the arrows showing how they may be combined in various arrangements to meet your need. There are 12 models of Cedarapids Portable Primaries, 3 models of Intermediate Crushing Units, any type of Secondary or Tandem-Crusher Plant you want, 4 sizes of Portable Screening Plants, 2 sizes of Portable Washing Plants, plus accessory components such as Vibrating Grizzlies, Pre-screening Attachments, Portable Bins and Conveyors. You can select the units you need to handle any kind of rock at lowest cost per ton.

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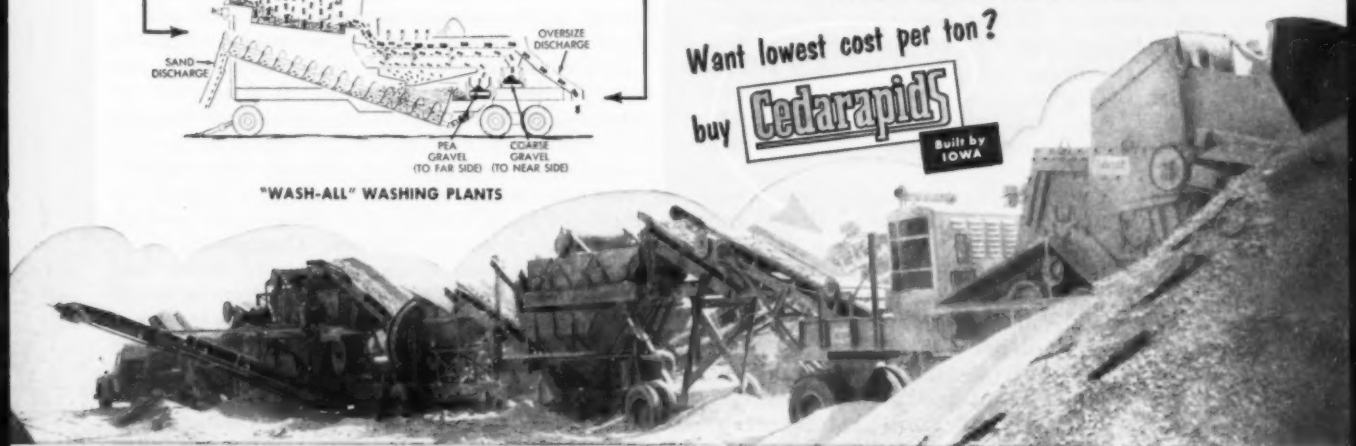

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These four Bulletins will give you complete details and specifications of the units you can select to make up a balanced, already-engineered Cedarapids Unitized Plant for your specific job. Write to Iowa for Bulletins PP-1 (Portable Primaries); UNIT-4 (Intermediate Units); UNIT-5 (Secondary Plants); and UNIT-6 (Unitized Plants). Your Cedarapids Dealer also will give you full information.

Looking west at Floyd Hill as of later summer. Here is where Lowdermilk's rock crews has such a scramble to begin the shelf. The old US 40 line skirts the hill, left center of picture. US 40 detour now threads under the two far bridges. Dual US 40 relocation will cross creek on two far bridges, the westbound lane to occupy a shelf (just begun) staying 25 ft. above the eastbound lane for 900 ft. before finding a lower level. US 6 one-way junction in right foreground. Junction in other direction involves loop-around beyond the bridges.

about 300 ft. to the loading dock. The pump was stationed alongside US 6 for easy access (discernible in picture behind power poles) : a Deming 3-cylinder, with 5-in. intake and 4-in. outlet. Six V-belts connected the pump to an F226 Continental Red Seal engine equipped with a Twin Disc clutch. The pump was pressure controlled, without storage tank.

Servicing the Job. Most of the fueling and servicing was done on the job between shifts. Grease and servicing equipment was mounted on a Ford F8 Big Job truck which carried tanks for 700 gal. of diesel fuel, 175 gal. gasoline and oil in barrels. Six rigs could normally be serviced in one-half hour. The service truck did not carry a compressor; air for tires was supplied by the firm's airbrake trucks which had compressors at 100 psi. No hose-reel lube equipment was used, the contractor preferring greasing by hand guns as previous experience had shown that careless operation of high-pressure air guns had resulted in the bursting of too many bearing seals.

On-the-spot repairs were made when necessary by mechanics from the trailer shop.

Supervisory personnel cruised the job constantly to make certain that all working areas were kept as smooth as the mountainous terrain would permit. Haul roads were bladed and watered continually.

Dozer operators worked closely with the shovels to facilitate loading. The use of dozers on the benches above the shovels was carefully controlled to prevent injury or damage to equipment, easily possible from rocks pushed carelessly over the edge.

Acknowledgement. Reuben Hopper, resident engineer for the Colorado state department of highways, under district engineer George N. Miles, handled this project in addition to supervising the staking and inspection of a pilot tunnel on another "I" project farther up Clear Creek. Daniel Handy was superintendent for the contractor, under the active direction of H. E. Lowdermilk, president.

Penn Turnpike Tunnels To Be Enlarged

The seven famous tunnels of the central portion of the Pennsylvania Turnpike—now providing only 2 lanes—have become bottlenecks during peak traffic periods. Both houses of the Pennsylvania state legislature has passed on a bill authorizing the Turnpike Commission to build additional tunnels.

Novel Cofferdam Scheme Saved Money with Batter Piles

Believed to be widely adaptable for highway and other bridge foundations involving a water crossing and unstable soil, this method saved both time and money on the Canadian project here described.

By J. Zorzi
Consulting Engineer, St. Eustache Sur-le-Lac, Quebec

One of the interesting problems encountered during the construction of the railroad from Port Cartier to Lac Jeanine was the centre pier for the bridge over the Rochers River at Mile 6.

The problem was not uncommon—about 13 ft. of water at low water, a river bed consisting of soft silty clay about 45 ft. deep, then a layer of sand over-lying bedrock.

The bottom of the foundation is about 22 ft. below the low water surface and 9 ft. below the riverbed. The reinforced concrete foundation for the pier is 24 ft. x 50 ft. x 6 ft. deep. It is supported on ninety 12″ x 12″ end bearing piles. All outside piles are driven on a batter of 1:4.

Any standard steel sheet piling cofferdam would have had to be clear of the batter piles and driven into the sand below. Even if sheet piling long enough and strong enough had been available—which it was not—and if there had been enough passive resistance in the few feet of sand overlying the bedrock to build a standard cofferdam, the cost would have been out of line. A two-wall jetty type, a cellular type and a crib cofferdam were also investigated and discarded for various reasons. It was finally decided to build the cofferdam as shown in Sketch 1.

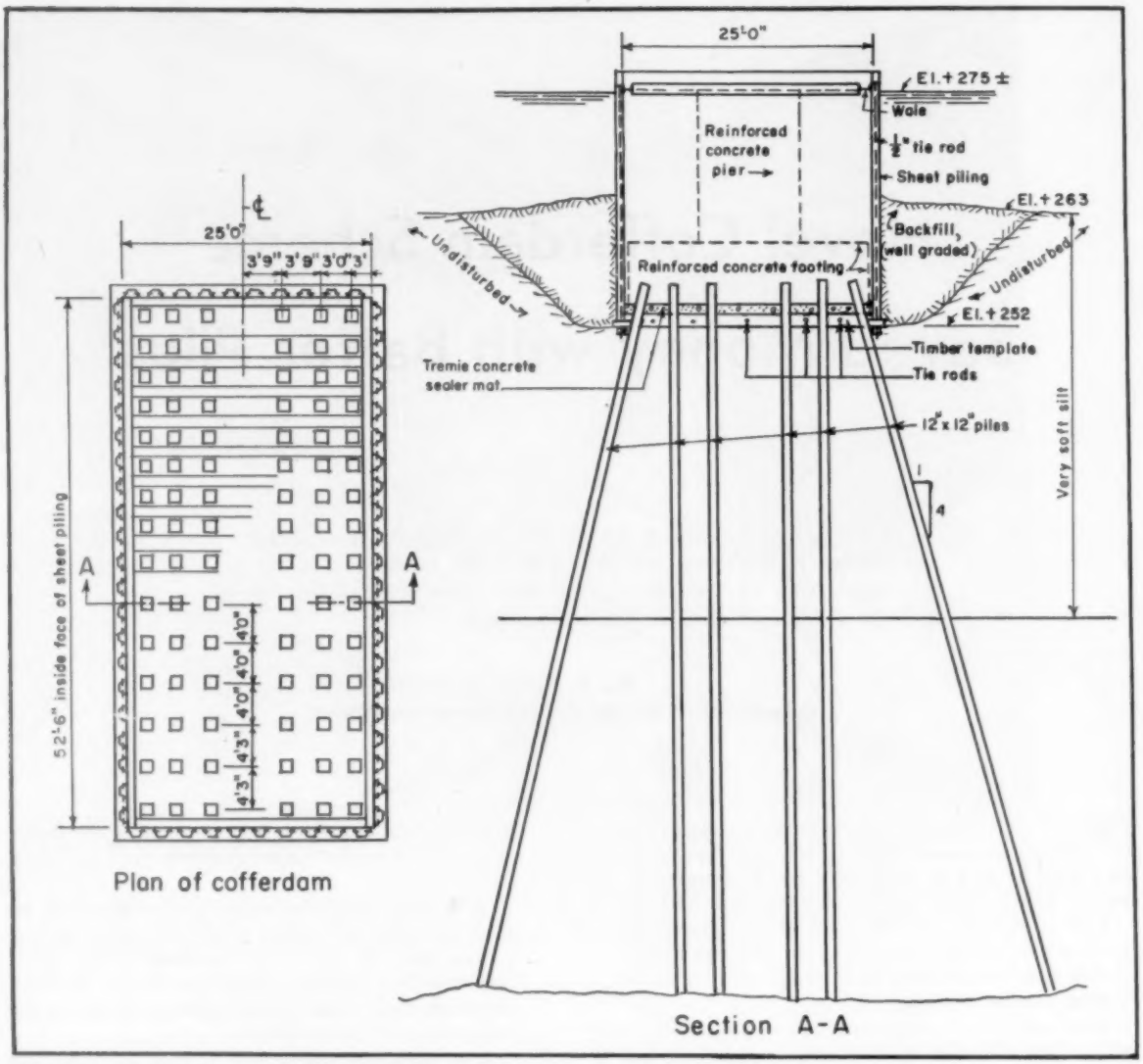
The idea was to excavate to somewhat below the underside of the footing, then to build a rigid and solid driving template slightly larger than the pier footing and strong enough to resist lateral pressure and distortion. The template was to have exactly-located guide holes for all the permanent bearing piles, and a ledge around the perimeter on which a sheet piling wall could be set.

This template or working platform was to be sunk onto the excavated river bottom with the centre lines in the exact position of the pier. Next the bearing piles were to be driven through the guide holes, and a sheet piling wall set on the ledge around the perimeter.

The template was to act as bottom wale and brace and also suport the sheet piling vertically. The setting up of the sheet piling wall could be done before or after the bearing piles were driven. If the soil was suitable, backfilling around the outside would hold back the water and the pumping out of the cofferdam could be done.

If the soil was porous or susceptible to piping, a concrete seal could be poured under water on top of the template.

After the concrete had hardened and bonded to the bearing piles the de-watering could be accomplished. In this case the concrete sealer mat would serve a two-fold purpose, first to seal the bottom against the entry of water and reduce the buoyancy of the cofferdam by the weight of the concrete, and second to utilize the withdrawing resistance of the bearing piles against the uplift by bonding of the concrete to the piles. In either case the time required to construct the pier would be greatly reduced and the cofferdam



Structural details of the foundation for a railway bridge pier, showing how batter piles were placed in relation to the cofferdam.

would have to be only slightly larger than the pile cap in spite of the batter piles.

The owner engineers who had to approve of the method to be used in building the pier, did see the advantage of the method outlined above and approved without hesitation.

A standard timber pile approach to the pier side was constructed. The river-bed was excavated with a clamshell as shown on the drawing. At the same time the laminated timber template was built on shore. The timbers were predrilled to a template and then slipped over the longitudinal tie rods. The over-lapping tie rods were tightened as the work progressed. After all the timbers were attached to each other, the pile guide holes were located in their respective positions and then cut out with a power saw.

The retaining wall shelf all around the outside of the template was then cut out. The longitudinal stringers were now bolted to the underside. The vertical tie rods were attached in their respective positions.

The template was pulled across the ice to the open water over the excavation. After placing the platform in its exact position at water level, four guide piles were dropped plumb through the guide holes and partly driven. A predetermined number of steel piles (just a few tons in weight above the buoyancy of the timber) were loaded on the template. The crane let the platform sink slowly to the excavated river bottom, the guide piles assuring its exact location.

A frame of 12 x 12" timber, having the same overall dimensions as the shelf on the submerged

(Continued on page 92)

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1578 Union Commerce Bldg.
Cleveland 14, Ohio

Eastern District
50 West 50th Street
New York 20, New York

Western District
10642 Downey Avenue
Downey, California

IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited, Toronto

SHELL

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COFFERDAM SCHEME

(Continued from page 90)

template, was positioned and allowed to freeze into the ice.

Starting on an upstream corner, the Algoma A-8 sheet piling was now threaded onto the ledge of the template and tied to the 12" x 12" timber frame at water level. Backfilling with till to the level of the existing river bottom was done. The backfill served two purposes. First, it was to hold the sheet piling on the self and secondly, it was to keep the water from piping through during the unwatering period at a later date.

Driving of the piles-through the guide holes was now started. Some piles had to be cut under water by a diver at the required elevation. After all piles were driven, a tremie concrete sealer mat was poured on top of the template. When the concrete had hardened enough and bonded to the piles, the unwatering was carried out and the rest of the piles cut. The foundation was built in the dry and in the usual manner.

As in everything else that is new and untried, there were details that could have been and will be improved. The guide holes should have been a ½" larger each way. There should be about 2 ft. of clearance all around the foundation to accommodate the pumps. All vertical ties and cross bracing should be levelled with gravel before the template is sunk into position. The shelf on the template should be higher and wider for easy threading of the sheet piling. There should be extra stringers under the template.

Before starting on this project the superintendents, foremen, and skilled labourers had to be won over to the new scheme. The work had to be explained in detail with answers, but a few were skeptical to the day of unwatering. The idea found a different reception with the engineers who had any contact with the job. They were very keen, interested, encouraging and helpful in every way.

Bringing this project to a successful conclusion was in a very large measure due to the combined efforts and co-operation of the staffs and engineers of the following:

Arbec Campbell Ltd., Canadian Aero Services Ltd., Pitts and Foley Ltd., Cartier Mining, Tippetts–Abbett–McCarthy–Stratton, and Cartier, Cote & Piette.

Urban Freeway Opening Described In Booklet

The opening of the Pueblo Freeway during the past summer was turned into an effective promotional event by the Colorado Department of Highways. Cooperating with local officials the department prepared an attractive 44-page pictorial brochure on the project. This booklet with numerous pictures and several may drawings explains "the story behind the Freeway", why it is so important to Pueblo and surrounding community, and showing some of the aspects of the construction job.

Several aerial pictures help the citizen visualize the entire project—something difficult for him to do from the ground even though he drives on it every day.

BIGGER TIRES— BIGGER EARTHMOVERS?

(Continued from page 56)

chines equipped with the first of the 37.5-33 tires have been in service for four years, what have been the results, especially tirewise? Here are the recent comments of Don Hughes, equipment superintendent for the Replogle outfit:

1. Tire costs have been in line. No. 37.5 tires were removed until well into the third season, except one that was cut through by a large iron bar. The injury was repaired at the Goodyear plant and the tire put back into service.

2. Several tires with treads worn off were found good for retreading. The results on the retreads were satisfactory, costwise.

3. Although the scrapers have been used a lot in rock and shale, (see again Roads and Streets, March 1959 article), the treads of the rear tires have worn down evenly and slowly, without excessive cutting.

4. The big tire-to-ground contacts have permitted better-than-average speeds on rough haul roads. As a result, the rigs have often outperformed smaller scrapers of the fleet by a wider margin than the direct difference in size. The MRS-Wooldridge units frequently could handle more yardage per day, by over 100 percent, than scrapers fully one-half their size. This percentage in their favor is highest on the long hauls, 3000 feet and upward.

One difficulty reported in the operation of the big machines is due to their width. It makes necessary roomier loading areas and extra wide haul roads to avoid slowdowns. Special care has been given to selection of jobs on which to use these outfits. This factor, however, hasn't kept the machines idle; they have been kept busy during the entire working seasons of the four years.

With such experience as Replogle's, the time would seem to be coming closer when other scraper manufacturers will come out with larger equipment, 44.5-45 tires. This still-bigger tire's usefulness could be capitalized on by 45-yd. struck scrapers, powered by high hp tractors or the G. E. wheel drive units, recently announced, with a motor in each wheel.

With 37.5 tires the maximum gross load that can be handled by a 4-wheel vehicle was 160,000 lb. Now that the 44.5 tires are ready, the weight can be stepped up to 275,000 lb. with tire pressure set at only 40 psi at a top speed of 30 mph.

Four 44.5 tires would have a ground contact of 80 sq. ft., when penetrating 3 in. into the hauling surface. Tire engineers estimate that this will be adequate, for typical earthmoving service. Each tire with its rim 37 in. wide and 45 in. in diameter at the beads, will weight nearly three tons, leaving over 250,000 lb. of load capacity per tire for machine and payload. That, with light alloy metals, would give a chance at more than 60-ton loads to be handled by one man from borrow pit to fill point and back—a real labor-saving setup, to mention only one element of economy and profit.

Will 1960 see this cost-cutting factor a reality? Five years between such progressive developments is long enough, many observers feel. It is up to the machinery manufacturers. The tire equipment is ready. Contractors of the country are waiting to try out the new rigs.

Reo's revolutionary new Flywheel P.T.O. brings to transit mix operators a "*bonus*" *payload increase from 400 to 600 lbs. per trip*—actual weight savings in a 6½ cu. yd. mixer unit resulting from the elimination of separate engine power.

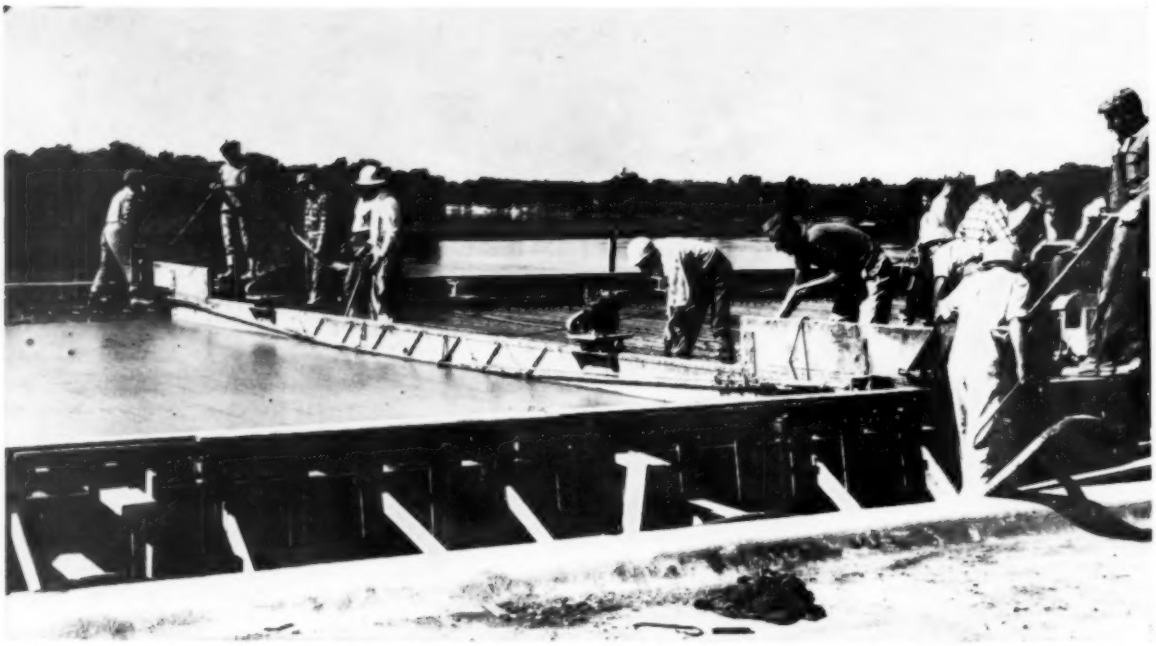
Also eliminated are the headaches of separate service and maintenance requirements.

Reo engineered and installed as an integral part of the chassis engine drive, the Reo Flywheel P.T.O. supplies the mixer with a lighter and more efficient new source of power—smooth . . . even flowing . . . direct.

Most important, operators can have the "bonus" payload advantage of Reo's new P.T.O. at a low initial cost of equipment.

Now available in Reo's rugged "C" Series line of transit-mix trucks. Another product of Reo's creative engineering skill has been added to the many important values found only in Reo Trucks. Reo Division, The White Motor Company, Lansing, Michigan.

Gold Standard of Values



38-foot monolithic slab being screeded with special Stow vibrating screed on bridge deck of North-South Expressway, north of Montreal. Note completed slab in foreground.

Another Wide Deck Pour

The Ferrer Construction Company had to pour two 38-ft.-wide monolithic slabs, side-by-side, on a long bridge on the North-South Expressway north of Montreal, Canada.

Making a monolithic slab required pouring the whole width at one time, which would mean striking off the entire 38-ft. at once. Since the slab had to be true to grade, rails for any screeding device would have to be mounted over points of no deflection, which in this case meant mounting them over the parapet reinforcement. A machine was required with an overall width of 46 ft. to ride on rails 11½-in. above the concrete surface.

Ferrer had the Stow Mfg. Co. build two special underslung vibrating screeds, the longest this firm had ever made. Two Stow vibrating Power Paks were mounted on each beam. The beam was made of OG "D" select douglas fir. Steel channels were bolted to the top and bottom of the beam. Steel reinforcement was welded from the top channel to the bottom and tie rods used to insure that no sag would occur while the screed was in use.

Ferrer pumped in 2 to 3 in. slump concrete to the approximate height of the screed and about 15 ft. ahead of it. Then the screed was pulled along by one man at each end and one man in the middle pulling on a rope. The concrete was off true to grade and vibrated at the same time. If a second pass needed, the rollers were tilted, lifting the beam up off the surface, so that it could be pushed back.

Upgrading Shown In New York State Roads

The most recent periodic sufficiency rating in New York State shows that the highway system is creeping upward in its quality.

A recent report covering highways in the state systems totaling 3,168 miles are deficient in structure, capacity or both.

This is a decrease of 1,368 miles from the 1949 report. Presently 21.1 percent of the state systems mileage is deficient excluding interstate and arterial routes. Most of the latter categories are now up to standard.

Big Scale Pre-Wetting

(Continued from page 67)

installed to provide adequate hillside drainage. It was found that light blasting was effective in increasing the flow of water into pipe trenches.

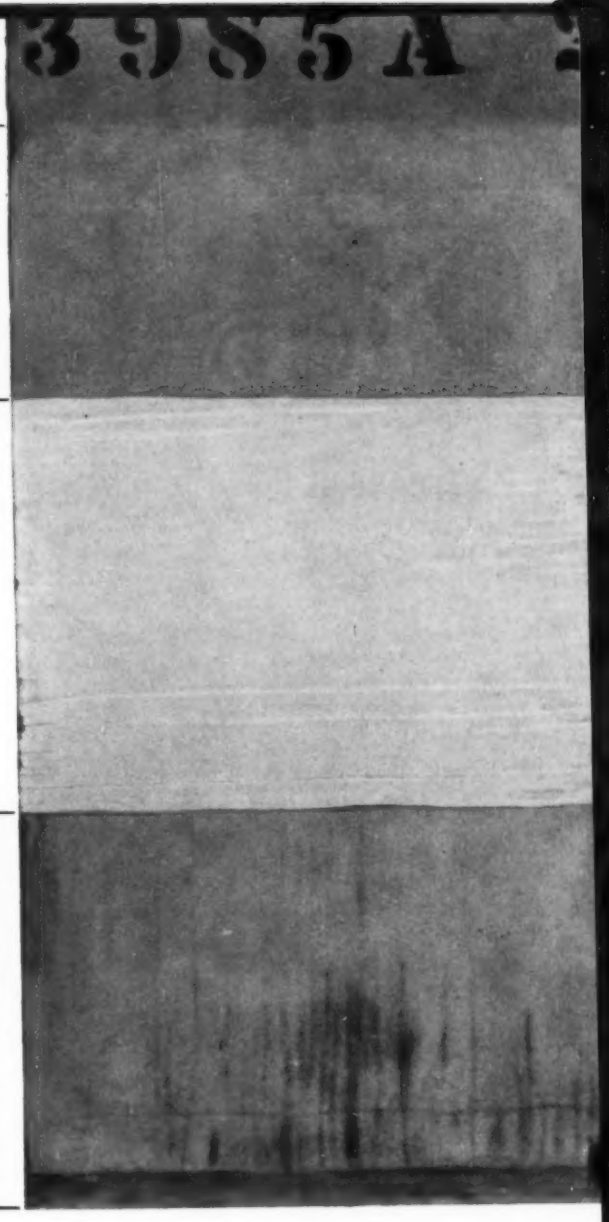
Taggart Construction Company, of Cody, Wyoming, owns and operates its own Cessna 180 airplane which company executives used at least once a week to visit the project. The one level stretch of the project was carefully graded and wind-sock installed for a landing field.

Acknowledgments. Leno Menghini was district No. 3 resident engineer for the Wyoming highway department. Del Benson, now in his 12th year with the contractor, was superintendent, with Alexander Grant and Jud Newton grade foremen.

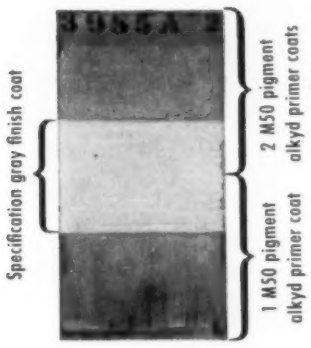
Area shaded from sun by wooden panel holder

After 9 years exposure, fading has barely begun to show in this 3-mil *M50* primer coat. Same type paint made with standard rust inhibiting pigment chalked and showed rusting in less than half this time.

Unshaded area



How test paints shown at right were applied



Exposed 9 years 45°S
Each coat 1.5 mils

1.5 mil M50 primer coat is still in place, still actively resisting corrosion after 9 years. Same type paint made with conventional pigment almost completely disappeared in the same period.

Proof M50 pigment Defense in Depth paints deliver lasting weather resistance

Never before such durable metal protection for highway bridges, guard posts, railings, sign posts. And never before such attractive color choices.

Here you see how typical *M50* pigment primer coats weather 9 years exposure. The advantages of weather resistance like this in the primer coat of an anti-corrosive paint system cannot be overstressed. Long after weather has worked its way through intermediate and finish coats, primers made with *M50* basic lead silico chromate pigment* still provide excellent weather protection. Rust inhibiting action in the film continues unchecked. Even breaks in top coats traceable to damage or painting mishaps do little harm.

The excellent chalk resistance shown by *M50* pigment primers also pays off handsomely. When steel erection is delayed, re-preparation of the steel is rarely needed. On-the-job spot priming is sharply reduced.

On the next page, see how typical *M50 finish* paints perform in severe exposure tests.

*Registered trademark of

National Lead Company

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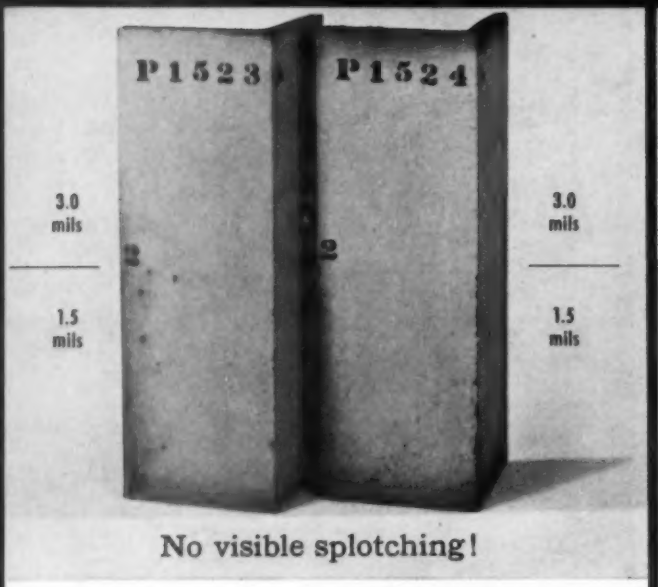
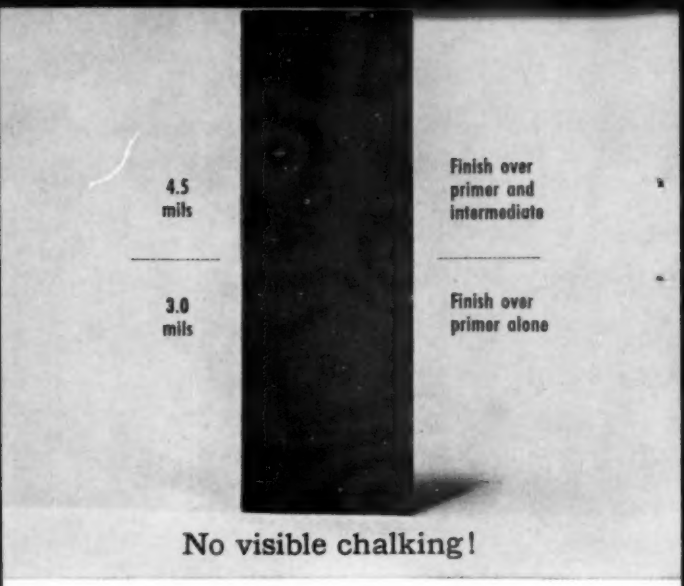


No visible splotching!

Test angles above show how a typical *M50* pigment finish paint applied directly to steel (no primer or intermediate) withstands 4 years exposure in industrial atmospheres. Left, *M50* pigment finish applied on rusted surface with retained mill scale. Right, same paint applied on clean, sand-blasted surface.



No visible chalking!

This test angle demonstrates the excellent resistance to chalking or fading shown by *M50* pigment Defense in Depth paints. Paint has been exposed 2 years, 45°S in normal atmosphere. The insolubility and stability of *M50* fused lead chromate pigment contributes substantially to this performance.

Here are two performance plusses you can expect from M50 anti-corrosive finish paints exposed to weather

With *M50** pigment Defense in Depth paints, *lasting* weather resistance is obtained in *all* coats . . . not just intermediates and finishes. This is clearly brought out by exposure tests such as the ones shown on this and the preceding page.

Along with lasting 3-deep weather resistance, *M50* pigment anti-corrosive paint systems give you 3-deep rust inhibition and 3-deep color choice. Never before has it been possible to produce specification anti-corrosive paints with comparable performances that could be sold at current market levels.

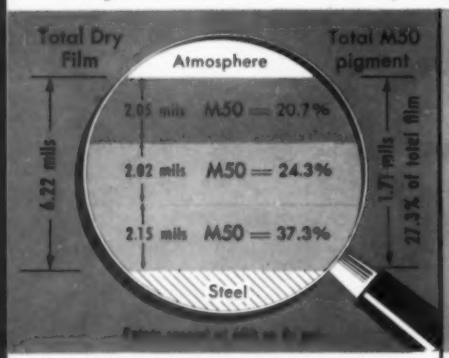
Now, with National Lead's *M50* pigment, most paint makers can make such paints.

National Lead is prepared to help your supplier formulate *M50* pigment paints and also: (1) show you *M50* pigment paint exposure test panels at its Sayville, L. I. Test Station; (2) send you a 24-page descriptive brochure, "Defense in Depth." (Mail coupon below); (3) provide technical aid in test applications; (4) help you develop suitable specifications for paints containing *M50* pigment.

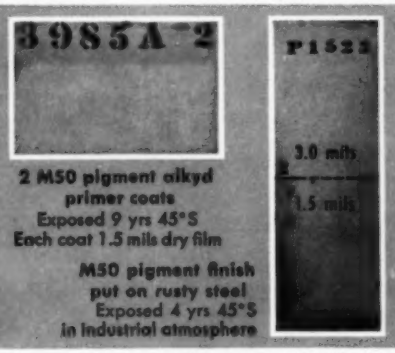
For M50 pigment paints themselves, contact your regular suppliers.

*National Lead Company trademark for a basic lead silico chromate pigment

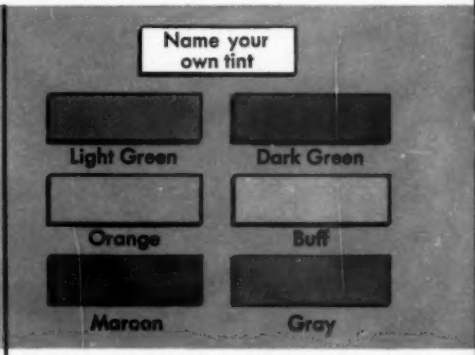
Why M50 Defense in Depth paints give you metal protection beyond all former concepts



In every coat . . . rust inhibition! Fused lead chromate is noted for rust-inhibition. The *M50* pigment particle structure permits paint makers to include large proportions of lead chromate in all coats of anti-corrosive systems.


3985A-2
2 M50 pigment alkyd primer coats
Exposed 9 yrs 45°S
Each coat 1.5 mils dry film
M50 pigment finish put on rusty steel
Exposed 4 yrs 45°S in industrial atmosphere
P 1523
3.0 mils
1.5 mils

In every coat . . . weather resistance! *M50* pigment is insoluble in water and has the excellent tint retention properties of fused lead chromate. Unlike other rust inhibitors, it actually boosts weather resistance of paints.



In every coat . . . your choice of colors! *M50* pigment gets along well with most tinting pigments, permits paint makers a wide range of colors . . . not only in intermediates and finishes but in primer coats as well. Colors stay true.

M50 Defense in Depth

National Lead Company,
111 Broadway, New York 6, N. Y.

Gentlemen: Please send me your 24-page brochure, "Defense in Depth." Include color card of the six *M50* pigment paints you recommend for steel highway structures.

Name_____ Title_____

Firm or Dept._____

Address_____

City_____ State_____

Likes the TL-20 because it's

MODERN, VERSATILE, RUGGED

With 325 miles of northern Illinois roads to look after and a budget to watch, Field Superintendent H. B. Brown, of Winnebago County, makes sure the equipment he has is modern and efficient in every respect.

He points out his TL-20 TRACTOLOADER as a good example because it is fast, does all kinds of jobs in the yard or out on the network of roads — and it's rugged.

Here are some of the jobs the TL-20 handles and the reasons it does 'em so well.

LOADS TRUCKS — Operator goes into and out of any gear at will with one lever — shortens loading time by using fastest gear working conditions allow. One-lever speed and direction control is an Allis-Chalmers exclusive!

STOCKPILES — Low carry and extra stability means no spilling and tipping — extra operator comfort.

CLEANS DITCHES — Tip-back bucket follows ditch without gouging banks or altering contours.

EXCAVATES — Digs into hard-packed material with bucket teeth . . . even handles the more demanding excavating jobs.

QUARRYING — Tears out rubble in quarries. Pin-connected planetary axle and one-piece welded frame proves itself in rough going.

OFF SEASON — During winter months, the TL-20 is a big help on snow removal and loading salt, cinders, crushed stone. In the spring, it digs out frost boils from the black top.

Want budget-beating performance on your work? Let your Allis-Chalmers dealer show you the TL-20 in action. There's a whole family of buckets to choose from — 2¼ to 5 cu yd. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

TRACTOLOADER is an Allis-Chalmers trademark.

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Load Coefficients for Analysis and Design of Bridge Girders

example problem, is a time-
ents and procedure which will
ne time needed for simple span

By Herluf T. Larsen

l Engineer, Robert W. Lowry, Inc., Consulting Engineers
Harrisburg, Pennsylvania

In the design of bridge girders, it is frequently necessary to use the wheel loads rather than lane loads. For the span lengths commonly used in ordinary bridge design these loads (AASHO Loadings) are as shown in Figure 1.

In this diagram F can be either the wheel load or the axle load.

In order to determine (1) the maximum moment and (2) the deflection due to the position of the wheel loads which cause maximum moment, the following loads must be used for the span lengths indicated:

a. For span lengths up to 23.90 ft., use one load, P, only.

b. For span lengths between 23.90 and 33.80 ft., use two loads, 2P.

c. For span lengths between 33.80 and 86.11 ft., use full truck and trailer loading, $\frac{9P}{4}$.

It is assumed that the girders are simply supported and have homogeneous cross-sections with constant moments of inertia.

For span lengths up to 23.90 ft., where only one load, P, is used, the maximum bending moment and maximum deflection due to live loads only, are, of course, determined from the formulas, respectively, for a simply supported beam with a single concentrated load:

$$M = \frac{1}{4} PL$$

$$\Delta = \frac{PL^3}{48EI}$$

When the spans exceed 23.90 ft., it is a little more difficult to determine the maximum moment and deflection due to live loads. Usually the standard handbooks do not give such formulas. For spans between 23.90 and 33.80 ft., where two loads, P, are used, the maximum bending moment may be found by the formula:

$$M = \frac{P}{2L} (L - 7)^2$$

With this maximum moment occurring at a distance of $\frac{1}{2}(L - 7)$ from the left hand support. The formula for deflection, due to the position of the loads causing maximum live load moment, is rather

(Continued on page 103)

TABLE I

L	a	c	$\frac{I}{P} \times R_A$	$\frac{I}{P} \times R_F$	$\frac{I}{P} \times M_B$	$\frac{I}{P} \times M_C$	$\frac{EI}{P} \times 10^{-4} \times \Delta$
23.90	8.45	11.41	0.703	1.292	5.975	1.875	517.99
24.00	8.50	11.45	0.709	1.291	6.021	1.938	534.52
25.00	9.00	12.07	0.721	1.279	6.480	2.560	637.23
26.00	9.50	12.65	0.731	1.269	6.942	3.173	750.47
27.00	10.00	13.24	0.741	1.259	7.407	3.778	876.13
28.00	10.50	13.81	0.750	1.250	7.875	4.375	1012.78
29.00	11.00	14.32	0.759	1.241	8.345	4.966	1161.63
30.00	11.50	14.93	0.767	1.233	8.817	5.550	1318.27
31.00	12.00	15.45	0.775	1.225	9.290	6.129	1497.55
32.00	12.50	16.01	0.782	1.218	9.766	6.703	1685.40
33.00	13.00	16.55	0.788	1.212	10.242	7.273	1880.34
33.80	13.40	16.97	0.793	1.207	10.625	7.725	2059.12

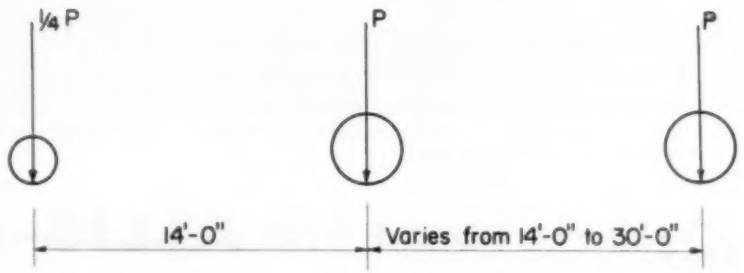
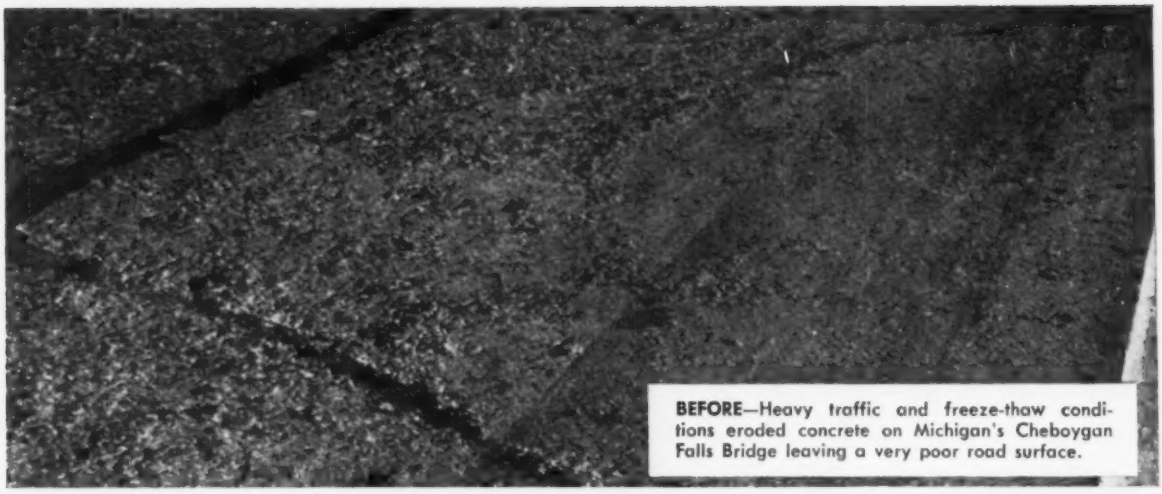
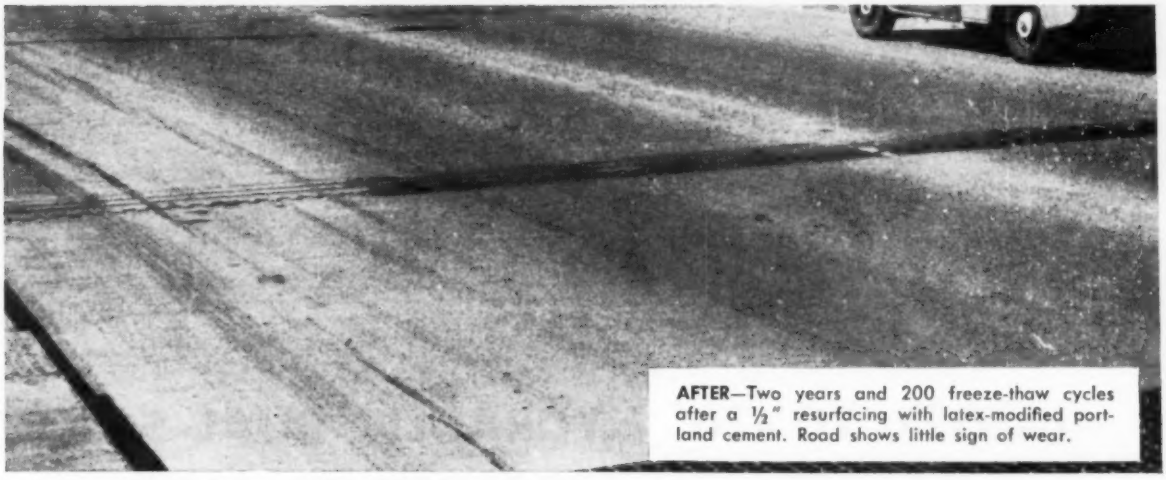


Figure 1

DOW | LATEX



BEFORE—Heavy traffic and freeze-thaw conditions eroded concrete on Michigan's Cheboygan Falls Bridge leaving a very poor road surface.



AFTER—Two years and 200 freeze-thaw cycles after a ½" resurfacing with latex-modified portland cement. Road shows little sign of wear.

SUPERIOR DURABILITY

indicated by 2-year bridge resurfacing exposure

First reports after two years of testing on Michigan's Cheboygan Falls Bridge indicate one of the most successful concrete resurfacing jobs ever to come down the pike! Results have spurred many highway engineers and research men to investigate new latex-modified portland cement. Other tests are now underway in Michigan, as well as New York, Vermont, Massachusetts and Ohio.

Here's what happened: It was found that even after two years the ½" resurfacing on the Cheboygan Falls Bridge showed no spalling . . . no pitting . . . practically no wear in spite of the heavy traffic, and approximately 200 freeze-thaw cycles! Low water absorption, plus greater pliability, tensile and bond strengths and ability to form a monolithic layer with the original concrete allowed the portland cement mortar modified with latex to conform to the expansion-contraction cycle of the concrete—and reduce stress on the new surface. And the latex-modified portland cement surfacing required a minimum thickness of only ½", compared with the 2" to 6" thicknesses required with conventional concrete resurfacing—a big saving in preparation costs.

This new latex for modifying portland cement is the result of Dow's constant research for new ways to make interior and exterior products better with latex. Start testing this remarkable product now. Write for a technical report giving full details on how to apply and test latex-modified portland cement on structural concrete bridges and highways. THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Department 2341EK9.

THE DOW CHEMICAL COMPANY · MIDLAND, MICHIGAN

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JAEGER 20′-26′ HYDRAULIC DUAL-SCREW SPREADER and SPREADER-FINISHER

. . . the 2 machines that head your non-stop paving team

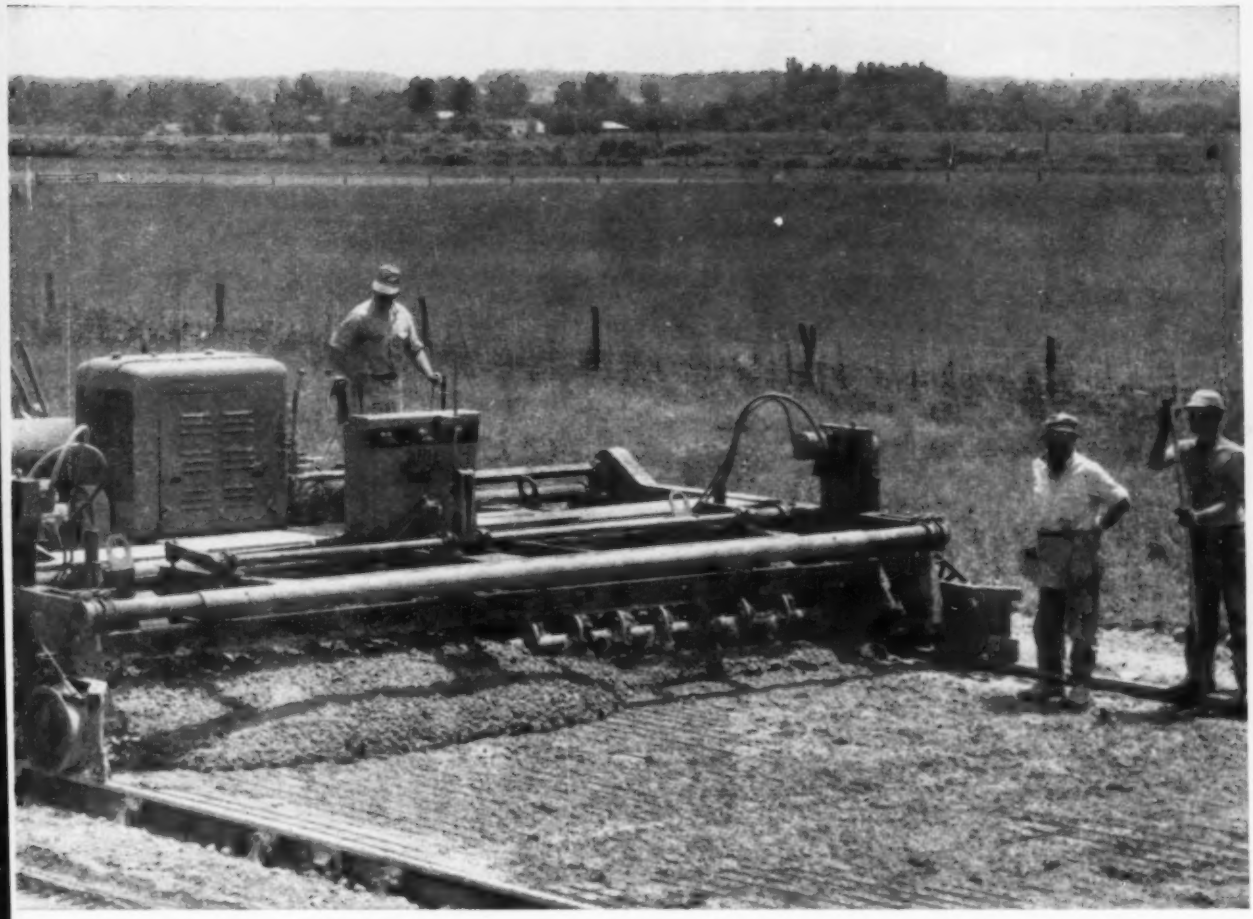
Now you can have the *hydraulic screw* spreader you've been waiting for, with or without finishing screed.

EASIEST TO OPERATE, FASTEST TO SPREAD: Operator merely "plays" hydraulic levers to control independent right and left hand spreading screws, speed them up, slow them down, reverse their rotation, and lift or lower. No other method gives such ease and accuracy of spreading, with capacity to handle largest paver production.

REMIXING BY SPREADING SCREW PRODUCES STRONGER SLAB: Paver batches are reworked and intermixed, densified in texture and compacted solidly against both subgrade and forms. No segregation, no honeycomb, as proved by hundreds of core tests in various states.

SCREED METERS MATERIAL TO FINISHER: When equipped with Jaeger 12″ screed, the Spreader is a Spreader-Finisher. It does everything a Spreader can do, plus making a precision strike-off of the top course, by oscillating screed, so as to meter exactly the right amount of material for the finishing machine.

When you use a Spreader-Finisher on top course, any excess or deficiency of material shows up when it is easiest to correct, and your finishing machine always works under ideal conditions.



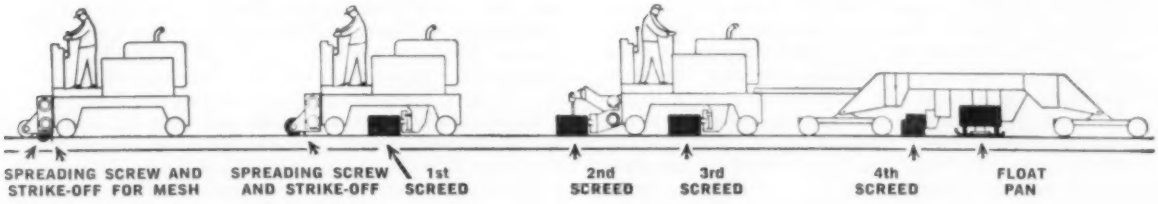
COMPLETE PAVING TEAM FOR TWO COURSE PAVEMENT

JAEGER SPREADER, with dual screws and strike-off, is vertically adjustable to as much as 7" below forms.

JAEGER SPREADER-FINISHER, with dual screws, strike-off and screed, lays top with accurately metered surface.

JAEGER FINISHER, with tandem screeds, does precision finishing job.

JAEGER FINISHER-FLOAT, with suspended hydraulic screed and drag float towed and operated from finisher, completes the finish, ready for burlap and cure.



2 MEN, 4 SCREEDS: On full depth pavement (no mesh required) the Jaeger Spreader-Finisher, Finisher and Finisher-Float, all on top course, give you a combination of spreading screw, strike-off, 4 screeds and a drag float, *with only 2 operators.* It equips you to do a perfect machine finishing job with minimum labor; it enables you to complete each day's run and knock off your finishing crew almost as early as your paver.

20' TO 26' TELESCOPIC WIDTH ADJUSTABILITY, easy wheel changes and choice of revolutionary new universal crown or gable crown screed and float pan, both with quick-crown-change, are Jaeger features. Get complete facts from your Jaeger distributor — or send for new Catalog DSP9. The Jaeger Machine Company, 223 Dublin Avenue, Columbus 16, Ohio. Jaeger Machine Company of Canada, Ltd., St. Thomas, Ontario.

JAEGER

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This Blaw-Knox, 3 compartment, 150 yard, aggregate batching plant is the first stop in a high speed, two-stop batching operation at Sawyer Air Force Base. Total project will require 300,000 cubic yards of concrete.

"Our Blaw-Knox Automatic Plant increased production 50%, cut our batching cost 25% per cubic yard"

"We load 2900 to 3000, 1¼ cubic yard batches of concrete a day," reports Arnold Anderson, Project Manager, Gust K. Newberg Construction Company and Hoyle-Newberg Construction Company, a Joint Venture. "Formerly, a manually operated aggregate batching plant took two minutes to load a truck. Then an additional three minutes were needed at the manual cement plant for loading. With our Blaw-Knox Automatic Batching Plant, this time has been cut to one minute at each stop . . . and human error is avoided by the guaranteed accuracy of the weighing and recording units.

"Elimination of on-the-job maintenance has made our high production record possible," he continues. "Other than ordinary maintenance procedures, accomplished when the plant is not in use, we've had no maintenance problems at all. We've been consistently operating on a ten hour day, six day week schedule."

Rigid construction schedules and ever-tightening specifications demand high speed, automatic batching. Let Blaw-Knox engineering and know-how build your production and profit. Contact your Blaw-Knox distributor about a unit "tailored" to fit your operation.

BLAW-KNOX

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LOAD COEFFICIENTS

(Continued from page 98)

complicated for determination and use. Table I for the given condition shown in Figure 2 furnishes the necessary coefficients for the critical data required for design and analysis of bridge girders these figures assume:

P = Rear Wheel or Axle Load, in kips, for the Standard AASHO Truck and Trailer Loading,

L = Span Length in ft.,

a = Distance, in ft., from left support to point of maximum moment, M_B,

Δ = Maximum Deflection, in in., for loading position indicated in Figure 2.

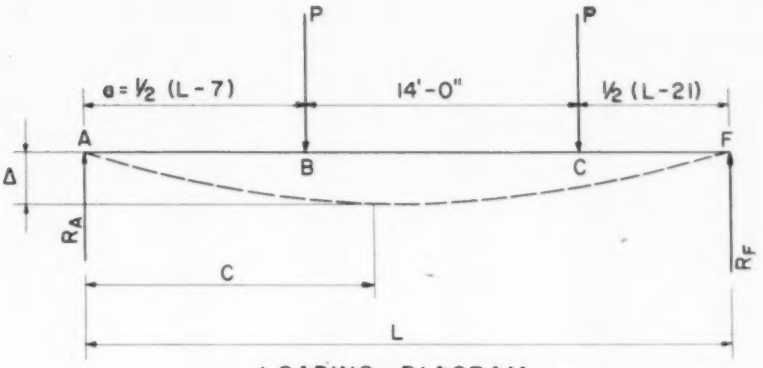
c = Distance, in ft., from left support to the point of maximum deflection for the position of the loads which produce maximum moment, as in Figure 2.

When the spans exceed 33.80 ft. but are less than 86.11 ft., the full truck and trailer loading must be used, as indicated by Figure 3:

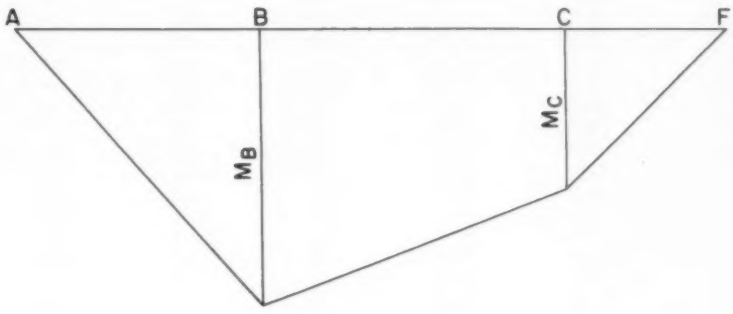
In this case, the maximum moment occurs under the middle load when that load is a distance of 1/6 (3L — 14) from the left-hand support and is given by the formula:

$$M_c = \frac{P}{16L} [9L^2 - 140L + 196]$$

The formula for deflection, due to the position of the loads causing maximum live load moment, is even more complicated than the similar formula for only two concentrated loads. Table II for the loading conditions shown above, furnishes the necessary coefficient for the critical data necessary for design and analysis of bridge girders.



LOADING DIAGRAM



MOMENT DIAGRAM

Figure 2

P = Rear Wheel or Axle Load, in kips, for the Standard AASHO, Truck and Trailer Loading,

L = Span Length in ft.

a = Distance, in ft., from left support to point of maximum moment,

Δ = Maximum Deflection, in in., for loading position indicated above,

c = Distance, in ft., from left support to the point of maximum deflection defined above.

For the determination of maximum shear, the following loads must be used for the span lengths indicated:

a. For span lengths up to 14'-0", use one load, P, only.

b. For span lengths between 14'-0" and 28'-0", use two loads, 2P.

c. For span lengths between 28'-0" and 58'-0", use full truck and trailer loading, 2.25 P.

d. For span lengths between 58'-0" and 72'-0", use full truck and trailer loading plus 75 percent of the trailer axle (or wheel) of the

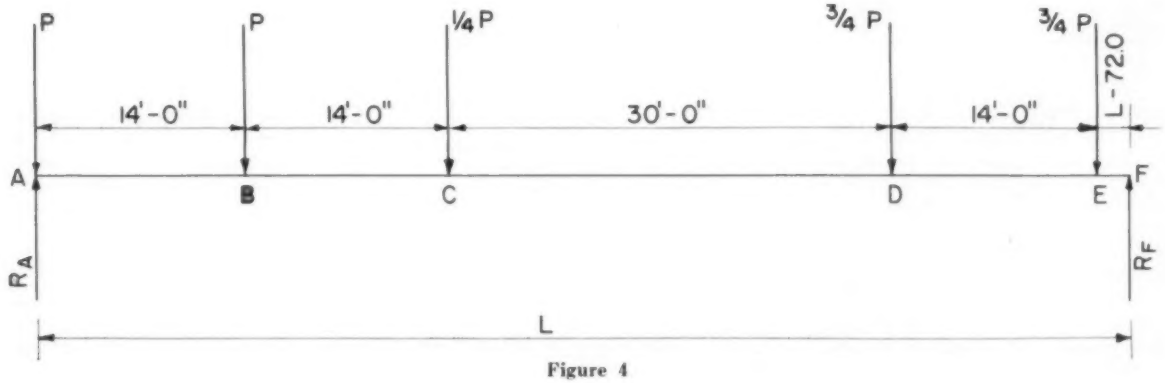


Figure 4

TABLE II

L	a	c	$\frac{I}{P} \times R_A$	$\frac{I}{P} \times R_F$	$\frac{I}{P} \times M_B$	$\frac{I}{P} \times M_C$	$\frac{I}{P} \times M_D$	$\frac{EI}{P} \times 10^{-4} \times \Delta$
33.80	14.57	16.86	0.971	1.279	0.55	10.62	6.70	2078.9
34.00	14.67	16.96	0.972	1.278	0.65	10.72	6.82	2118.4
35.00	15.17	17.47	0.976	1.274	1.14	11.28	7.44	2267.1
36.00	15.67	17.98	0.980	1.270	1.64	11.83	8.04	2488.8
37.00	16.17	18.49	0.984	1.266	2.14	12.39	8.65	2725.6
38.00	16.67	19.00	0.987	1.263	2.64	12.92	9.26	2978.2
39.00	17.17	19.51	0.991	1.259	3.14	13.49	9.86	3247.3
40.00	17.67	20.02	0.994	1.256	3.64	14.05	10.44	3533.4
41.00	18.17	20.53	0.997	1.253	4.16	14.60	11.03	3837.2
42.00	18.67	21.04	1.000	1.250	4.67	15.17	11.64	4159.9
43.00	19.17	21.55	1.003	1.247	5.19	15.74	12.24	4500.7
44.00	19.67	22.06	1.006	1.244	5.71	16.28	12.88	4861.9
45.00	20.17	22.57	1.008	1.242	6.22	16.80	13.47	5243.6
46.00	20.67	23.08	1.011	1.239	6.75	17.40	14.06	5646.4
47.00	21.17	23.59	1.013	1.237	7.28	17.93	14.63	6071.2
48.00	21.67	24.10	1.016	1.234	7.81	18.54	15.23	6518.5
49.00	22.17	24.61	1.018	1.232	8.33	19.07	15.81	6989.4
50.00	22.67	25.12	1.020	1.230	8.85	19.67	16.39	7484.5
51.00	23.17	25.63	1.022	1.228	9.38	20.15	16.98	8004.4
52.00	23.67	26.14	1.024	1.226	9.92	20.77	17.58	8550.1
53.00	24.17	26.65	1.026	1.224	10.42	21.28	18.17	9122.5
54.00	24.67	27.16	1.028	1.222	10.97	21.88	18.77	9722.1
55.00	25.17	27.67	1.030	1.220	11.49	22.40	19.33	10349.9
56.00	25.67	28.18	1.031	1.219	12.02	23.00	19.92	11006.7
57.00	26.17	28.69	1.033	1.217	12.58	23.53	20.47	11693.4
58.00	26.67	29.20	1.034	1.216	13.10	24.12	21.07	12410.7
59.00	27.17	29.71	1.035	1.215	13.63	24.60	21.66	13159.6
60.00	27.67	30.22	1.037	1.213	14.28	25.20	22.24	13940.8
61.00	28.17	30.73	1.038	1.212	14.70	25.72	22.82	14755.4
62.00	28.67	31.24	1.039	1.211	15.20	26.22	23.42	15604.2
63.00	29.17	31.75	1.041	1.209	15.78	26.85	24.00	16488.2
64.00	29.67	32.26	1.042	1.208	16.33	27.50	24.54	17408.2
65.00	30.17	32.77	1.043	1.207	16.88	27.90	25.18	18365.2
66.00	30.67	33.28	1.044	1.206	17.41	28.55	25.68	19360.0
67.00	31.17	33.79	1.045	1.205	17.95	29.00	26.37	20393.7
68.00	31.67	34.30	1.046	1.204	18.55	29.75	26.80	21467.3
69.00	32.17	34.81	1.047	1.203	19.08	30.28	27.40	22581.7
70.00	32.67	35.32	1.048	1.202	19.60	30.80	28.00	23737.9
71.00	33.17	35.83	1.049	1.201	20.13	31.33	28.60	24936.8
72.00	33.67	36.34	1.050	1.200	20.65	31.85	29.20	26179.4
73.00	34.17	36.85	1.051	1.199	21.18	32.38	29.80	27466.9
74.00	34.67	37.36	1.052	1.198	21.70	32.90	30.40	28800.4
75.00	35.17	37.87	1.053	1.197	22.44	33.78	31.00	30180.6
76.00	35.67	38.38	1.054	1.196	22.97	34.31	31.33	31608.7
77.00	36.17	38.89	1.055	1.195	23.50	34.84	31.93	33086.0
78.00	36.67	39.40	1.056	1.194	24.03	35.37	32.52	34613.2
79.00	37.17	39.91	1.05	1.193	24.56	35.90	33.12	36191.8
80.00	37.67	40.42	1.058	1.192	25.09	36.43	33.71	37822.5
81.00	38.17	40.93	1.059	1.191	25.62	36.96	34.31	39506.6
82.00	38.67	41.44	1.060	1.190	26.15	37.49	34.90	41245.1
83.00	39.17	41.95	1.061	1.189	26.68	38.02	35.50	43039.3
84.00	39.67	42.46	1.062	1.188	27.21	38.55	36.09	44890.3
85.00	40.17	42.97	1.063	1.187	27.74	39.08	36.69	46799.3
86.00	40.67	43.48	1.064	1.186	28.27	39.61	37.28	48767.3
86.11	40.72	43.53	1.064	1.186	28.32	39.66	37.44	48987.8

next truck and trailer, 3P.

e. For span lengths between 72′-0″ and 86′-0″, use full truck and trailer loading plus 75 percent of both rear axles (or wheels) of the next truck and trailer, 3.75 P.

The general loading diagram for maximum shear is shown in Figure 4, where:

P = Rear Wheel or Axle Load, in kips, for the Standard AASHO Truck and Trailer Loading.

L = Span Length, in ft.

V = Maximum Shear (End Reaction at left-hand support).

For spans up to 14′-0″, the maximum shear is equal to P.

For spans greater than 14′-0″, the maximum shear is given in Table III,

Example: As an example, assume a span length of 48′-8.5″ center to center of bearings. The stringer and/or floor beam arrangement is such that the beam or girder will carry the full wheel loading plus 60 percent of the other wheel loads. Select a beam or girder to carry an H20-S16-44 loading.

Since the span length is greater than 33.80 ft., but less than 86.11 ft., the full truck and trailer loading must be used. In this case, the maximum wheel load is 16.0 kips, and

P = 16.0 × 1.6 = 25.6 kips

$L = 48' - 8.5'' = 48.71$ ft.

From Table II, interpolating between span lengths of 48 and 49 ft., the following coefficients are determined:

$a = 22.03$ ft.

$\frac{I}{P} \times M_c = 18.92$ ft.

$c = 24.46$ ft.

$\frac{EI}{P} \times 10^{-6} \times \Delta = 6852.8$ in.^{3}

Using the AASHO impact formula:

$$\text{Impact} = \frac{50}{48.71 + 125} = 28.78 \text{ percent.}$$

Use 29 percent

Consequently:

the maximum moment, $M_c = 18.92 \times 25.6 \times 1.29 = 624.81$ ft.-kips, which occurs at a distance of 22.03 ft. from the left-hand support; for an allowable flexural stress of 18,000 psi, the required Section Modulus is:

$$S = \frac{624.81 \times 1{,}000 \times 12}{18{,}000}$$

$$= 416.27 \text{ in.}^3$$

The maximum deflection, due to the position of the live loads (plus impact) which produce maximum bending moment, occurs at a distance of 24.46 ft. from the left-hand support, and is of the following magnitude:

$$\Delta_{LL+I} = 6852.8 \times \frac{25.6 \times 1.29 \times 1{,}000{,}000}{29{,}000{,}000\ I}$$

$$= 7803.69 \times \frac{1}{I}$$

If the allowable deflection is kept to 1/800 of the span length, this restriction amounts to

$$\Delta_{allow.} = \frac{48.71 \times 12}{800} = 0.731 \text{ in.}$$

Consequently the Moment of Inertia, required to limit the deflection due to live loads plus impact, is computed as follows:

$$0.731 = 7803.69 \times \frac{1}{I}$$

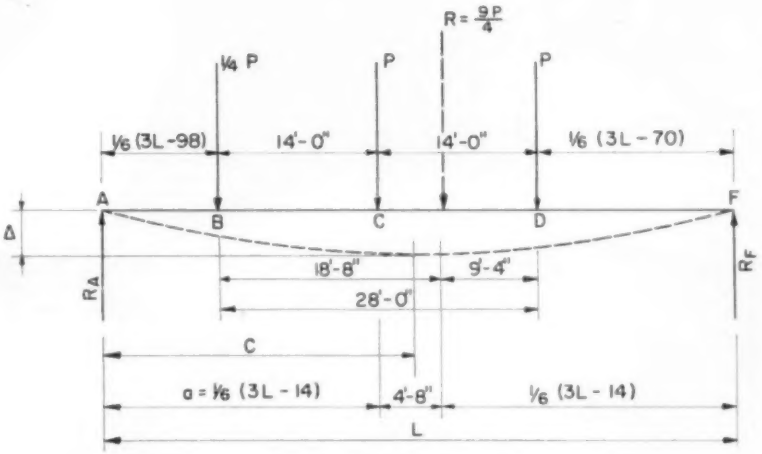
$$I = \frac{7803.69}{0.731} = 10{,}675.36 \text{ in.}^4$$

From Table III, the coefficient for maximum shear is interpolated as follows:

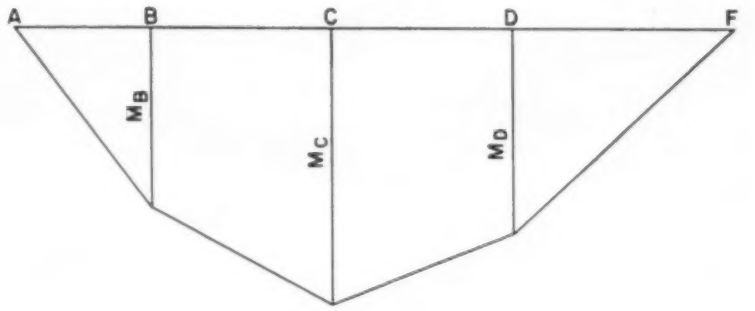
(Continued on page 175)

TABLE III

L	$\frac{I}{P} \times V$	L	$\frac{I}{P} \times V$	L	$\frac{I}{P} \times V$
15.00	1.067	39.00	1.712	63.00	1.976
16.00	1.125	40.00	1.725	64.00	1.992
17.00	1.177	41.00	1.738	65.00	2.008
18.00	1.222	42.00	1.750	66.00	2.023
19.00	1.263	43.00	1.762	67.00	2.037
20.00	1.300	44.00	1.773	68.00	2.051
21.00	1.333	45.00	1.784	69.00	2.065
22.00	1.363	46.00	1.794	70.00	2.079
23.00	1.391	47.00	1.803	71.00	2.092
24.00	1.417	48.00	1.813	72.00	2.104
25.00	1.440	49.00	1.822	73.00	2.127
26.00	1.461	50.00	1.830	74.00	2.149
27.00	1.481	51.00	1.838	75.00	2.170
28.00	1.500	52.00	1.846	76.00	2.191
29.00	1.526	53.00	1.854	77.00	2.211
30.00	1.550	54.00	1.861	78.00	2.231
31.00	1.572	55.00	1.868	79.00	2.250
32.00	1.594	56.00	1.875	80.00	2.269
33.00	1.614	57.00	1.882	81.00	2.287
34.00	1.633	58.00	1.888	82.00	2.305
35.00	1.650	59.00	1.907	83.00	2.322
36.00	1.667	60.00	1.925	84.00	2.339
37.00	1.683	61.00	1.943	85.00	2.356
38.00	1.698	62.00	1.960	86.00	2.372



LOADING DIAGRAM



MOMENT DIAGRAM

Figure 3

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reinforce with

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The Image of CF&I stands for years of research and experience that produce continually improved steel products for all industries. One of these products—CF&I-Clinton Welded Wire Fabric—is used to combine the strength of steel with the permanence of concrete. When the steel fabric is used to reinforce the concrete, it adds years of trouble-free life to roads and highways. Here's why:

CF&I-Clinton Welded Wire Fabric provides a steel skeleton that spreads the heavy loads evenly. The wear and tear of every-day traffic is distributed over the entire area of the concrete.

What's more, CF&I-Clinton Welded Wire Fabric helps eliminate cracks which might occur while the concrete is setting. And the steel fabric minimizes cracking and heaving that result from extreme temperature changes. Should a small fissure develop, the fabric holds it tightly together, preventing dirt or moisture from expanding it.

Before starting your next concrete job, get in touch with the nearest CF&I office. One of our engineers will be glad to discuss your reinforcing requirements with you.

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THE COLORADO FUEL AND IRON CORPORATION

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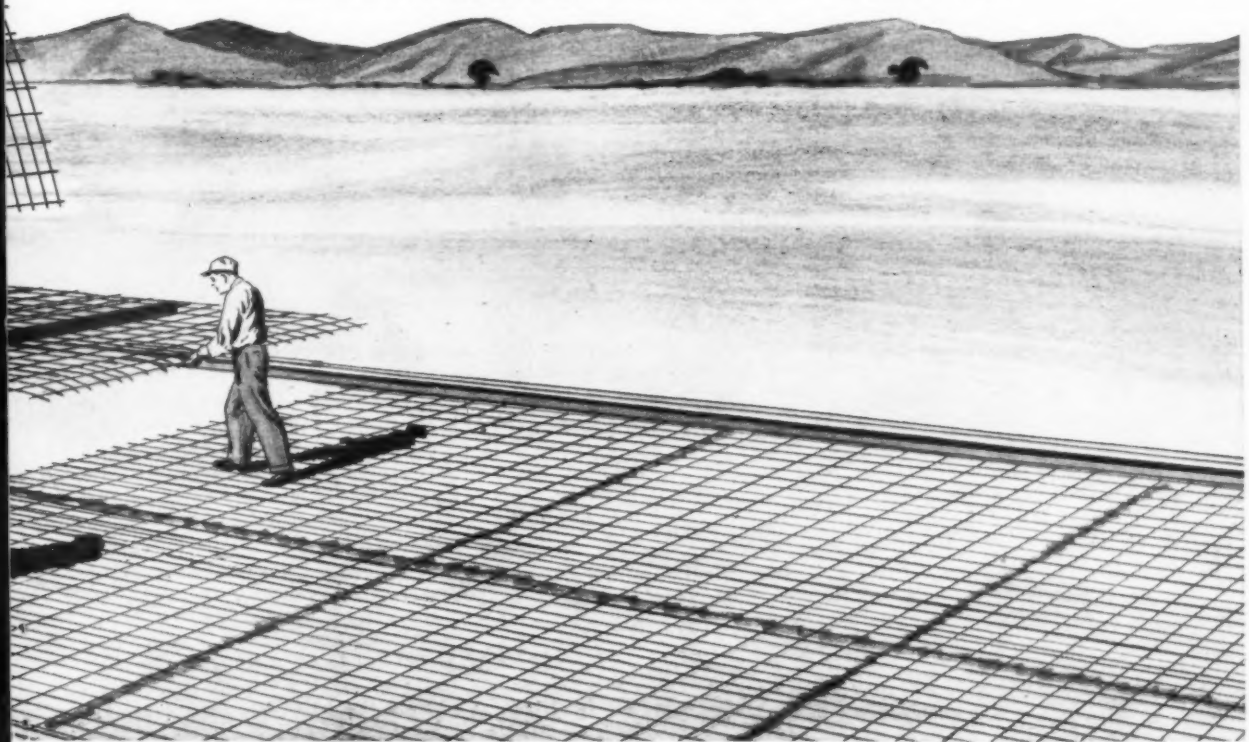

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Are Your Workers Properly Job-Classified?

Descriptions of the common jobs on highway construction have been classified for legal purposes by the Tennessee Road Builders Association.

Highway contractors these days must properly classify the job of every man on their projects. Otherwise they may find themselves in hot water over wage rates and related legal difficulties.

With this problem in mind the Tennessee Road Builders Association some months ago prepared a booklet for its members which, among other things, clearly defines the various types of jobs likely to be found on a highway project. According to executive secretary Leslie T. Hart of the association this booklet represents numerous conferences between contractors and representatives of the State Labor Department and the State Highway Department, and is primarily written for the Interstate work.

Most of the Association's job descriptions are included in the following. Omitted for lack of publishing space are certain jobs less often encountered, or similar to an item here included except for equipment size, etc.

* * * *

AIR TOOL MAN.—*A semi-skilled laborer.*—A general term applied to any worker who uses a tool driven by compressed air to perform such work as breaking old pavement, loosening or digging hard earth, trimming bottom and sides of trenches, breaking large rocks, driving sheeting, chipping concrete, trimming or cutting stone, calking steel plates, or compaction of earth en backfill. May perform other related semi-skilled duties.

ASPHALT HEATERMAN.—*A semi-skilled laborer.*—Tends a stationary or portable liquid asphalt tank, starts fires (usually fuel oil) under the tank, controls heat applied to the tank by regulating dials or burners, maintains desired temperature in asphalt, regulates valves for discharge of asphalt from tank. May perform other related semi-skilled duties.

ASPHALT RAKER.—*A semi-skilled laborer.* Distributes asphaltic road-building materials evenly over road surface by raking and brushing material to correct thickness; may control screed to regulate width and depth of materials; directs ASPHALT SHOVELERS when to add or take away material to fill low spots or to reduce high spots. May perform other related semi-skilled duties.

BATCHING PLANT SCALEMAN.—*A semi-skilled laborer.*—Manually operates a stationary or portable batching scale that weighs out concrete materials. Adjusts scales for required weight of the materials. Operates controls that admit materials separately from storage hoppers to weighing bins. Observes scales or indicators that show when proper amount of materials have been made. Discharges materials from weighing bin into truck or other carrier or mixer. He may measure materials by volume instead of weight. May perform other related semi-skilled duties.

CARPENTER—JOURNEYMAN, FOREMAN OR APPRENTICE.—Sets all batterboards, works from blueprints, does layout, builds forms in panel yard and in place on job. Sets all wood-working equipment and operates same. Builds forms for precast and prestressed concrete of all types and shapes. Sets same. Releases forms from concrete work when forms are to be reused. May perform related carpenter duties.

CEMENT FINISHER TENDER.—*A semi-skilled laborer.*—Assists concrete finisher by performing specific or general duties of a lesser skill, such as keeping finisher supplied with materials, tools, and supplies, cleaning work area and equipment; and holding materials or tools. May place and pull out dummy joints in concrete paving. Drags canvas belting or burlap strip across surface to give rough texture. Removes bulges, rough spots and defective concrete by hammer, chisel or air tool. Helps finisher to bull float and puddles concrete. Does hand mixing of cement materials and grades. May perform other related semi-skilled duties.

CONCRETE FINISHER.—Levels and smoothes fresh concrete surface to desired grade and contour by use of steel trowels and wooden floats, by pushing and pulling screed or template over the surface, and smoothes with a float or straight edge. Finishes concrete for curb and gutter, fits together, aligns and sets to grade curb and gutter forms and screeds of one board heighth. Uses finishing tools on exposed surface of concrete masonry after the forms have been removed to patch holes and broken corners with fresh concrete, rubbing surface with abrasive stone to remove rough spots. May perform other related duties.

CONCRETE PAVING SAW OPERATOR.—*A semi-skilled laborer.*—Operates a water-cooled power saw with either diamond or an abrasive blade to saw expansion and contraction joints in concrete paving. May also be used to saw asphaltic pavements. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed. May perform other related semi-skilled duties.

CUTTING TORCH OPERATOR.—*A semi-skilled laborer.*—Uses cutting torch only for demolition work on steel or other metal structures. May perform other related semi-skilled duties.

ELECTRICIAN.—Plans and executes the layout of electrical conduit, installs wiring systems, switch-panels, buss bars, works on overhead distribution systems and underground distribution systems. May perform other related duties.

(Continued on page 112)

Protect against accidents like this!

Use straight Morton Rock Salt—the most effective way to help keep streets, freeways and tollroads safer in winter

Straight Morton Rock Salt does the job abrasives and Salt mixed with abrasives can't do to help prevent accidents caused by ice and snow. Morton Rock Salt gives *abrasive traction* against skidding even before the salt starts to melt the ice. Rock Salt crystals are larger than other commonly used ice melting chemicals and *penetrate ice deeper* with a corkscrew action—not just melt surface ice. Due to Rock Salt's better penetration, it reaches the pavement fast and quickly *melts* the bond between ice and the street surface.

Morton Rock Salt is safe, clean, economical

Straight Morton Rock Salt is non-toxic. It does not damage animals' paws, rubber, fabrics, leather, asphalt, brick or properly seasoned concrete. It will not clog sewers or leave a rutted, dirty pavement as will sand or cinders. What's more, Rock Salt melts *more ice at lower cost* at any temperature above 8° F. than any other commonly used ice melting chemical.

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☐ I would like a Morton representative to advise me on how best to stockpile Morton Rock Salt.

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LW PHOTO REPORT

Big, high-production earthmoving fleet sets fast pace for Canonie Construction Co.

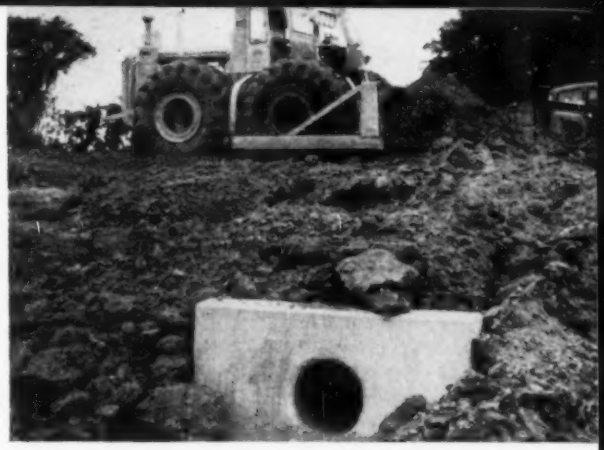
With a big fleet of LeTourneau-Westinghouse high-production earthmovers — consisting of 21 C Tournapulls® with 18-yd Fullpak® scrapers, 4 D Tournapulls with 9-yd scrapers, 2 Tournatractors®, and a 123-hp LW grader — Canonie Construction Co. of South Haven, Michigan, handles jobs from 50,000 to 5,000,000 yd with equal efficiency. And Canonie finds the flexibility and mobility of this fleet easily adaptable to the handling of a number of jobs at the same time.

On the job pictured — moving 650,000 yd of earth to rebuild 7.5 miles of Michigan Route 140 — Canonie worked all of his LW machines except 3 C Fullpaks, which were working on a building site in Kalamazoo.

Which size LW fleet is best for YOUR operation?

As you plan for future operations, it is worth your while to investigate the flexibility and overall economy of LW earthmoving equipment. These machines incorporate all of the latest engineering advantages developed over the years by LW engineers, and proved in thousands of hours of actual field operation. With an LW fleet you can be assured of top production, economy, and profit on *any type of job*. Tournapull scrapers are available in 9, 18, 20, and 28-yd capacities; 143 to 360 hp. Each fits specific job problems. You can have the right combination of machines to give you most for your money. We'd like to discuss with you the size machines best for YOUR fleet operation.

In rapid succession, Canonie's fast-moving C 'Pulls* dump loads of sticky clay to build bridge-approach. The positive-ejection tailgate on the LW scraper, has plenty of power to force out sticky clay, mud, rocks — wipes bowl clean in a single pass. Control of tailgate is by positive electric control.



Here, one of 21 C Tournapulls owned by Canonie Construction is push-loaded with sand, building 7.5 miles of Michigan State Route 140, between Covert and Watervliet. Says Mr. T. Canonie, President of the firm, "The low, wide Fullpak scraper-design *cuts seconds off loading time. In a couple of weeks, this adds up to a substantial amount of bonus yardage.* And we like 'Pulls electrical system . . . certainly makes it easy for our operators to control their units."

One of two Tournatractors owned by Canonie Construction Co. backfills around a culvert on the 650,000-yd Michigan Route 140 project. Comments Mr. Canonie, "You can move this rubber-tired tractor from one location to another without the necessity of bringing in a low-boy trailer. As a matter of fact, we have a 2-way radio system in our LW tractors so we can move them around fast . . . without wasting time tracking 'em down.

"We think our Tournatractors are great for leveling *and compacting* fill," continues Mr. Canonie, "the rolling action of their big tires as they work across the fill gives us all the compaction we need. We hydroflate the tires to get added weight." (With tires hydroflated, Tournatractor itself provides bonus compaction equivalent to an extra 20-ton roller.)

Small-yardage and clean-up jobs are handled fast and efficiently by Canonie's 4 LeTourneau-Westinghouse D Tournapull scrapers. Here, two of these 29.5-mph "Handymen" are shown self-loading sandy soil as they handle finish work on a Michigan road job. Only 8'-wide and within the 9-ton axle-load limit, D 'Pull can be driven from job-to-job via highway or city streets without permit.

For the type of work done by Canonie Construction Co. the LW 550 is considered a sound grader investment. Here this 123-hp grader cuts trench for 6,600'-long tile line near Watervliet, Mich. Equipped with 8'-wide dozer blade, Canonie's versatile LW 550 handles backfilling and other light dozing jobs as well as regular grading assignments.

*Trademark CP-2067-DCJ-2

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

. . . for more details circle 329 on enclosed return postal card

(Continued from page 108)

FORM SETTER (METAL ROAD FORMS).—*A semi-skilled laborer.*—Fits together, aligns and grades metal road forms for holding concrete in place on road and street surfaces. Dismantles, moves and cleans forms after concrete hardens. May perform other related semi-skilled duties.

GRADE SETTER.—*A semi-skilled laborer.*—Keeps stakes and stringline set in place out in front of trenching machine so that machine will cut ditch in correct location. Sets stakes so that pipe layers can finegrade ditch and measure from the batter board down to correct depth of ditch. May perform other related semi-skilled duties.

IRON WORKER, REINFORCING—JOURNEYMAN, FOREMAN OR APPRENTICE.—Performs layout work for rods within area to be paved. Fastens rods in place with wire or fasteners; bends or adjusts as required.

Selects and places steel bars or spirals in concrete forms to reinforce concrete; fastens rods together with wire or patented fasteners; may cut rods with hack-saw or oxyacetylene torch. May bend rod, using a rod bending machine, performs layout work and proper placing of steel in the concrete forms. May prefabricate reinforcement assembly for placement complete in forms. May perform other related ironwork duties.

IRON WORKER, STRUCTURAL—JOURNEYMAN, ETC.—Works as a member of a group that raises and places fabricated structural steel members, such as girders, plates, columns, and unites them permanently to form a completed structural steel framework. Heats rivets, signals erection crane, splices cables, rigs equipment. May include dismantling and erecting large units of equipment. May spin suspension bridge cables. May perform other related ironwork duties.

LABORER, COMMON.—A general term used on construction work covering many unskilled occupations. A laborer works with all crews doing everything from pick and shovel work to cleaning up lumber with hammer; shoveling and placing concrete; applying coats of oil to inside face of forms; stripping forms; working on rock crusher to feed trap; opening cement sacks at batch plant; lowering pipe into ditch for pipelayers; working with dirt crew to move construction layout stakes; working as flagman, signalman or spotter to control traffic; serving as dumpman; spreading hot asphaltic material over roadbed with shovel; operating hand concrete buggy or wheelbarrow; helping painter to prepare surfaces for painting and cleaning paint equipment; carries rods to form or attaches them to cable of hoisting machine. May perform other related duties.

PAINTER, BRUSH.—Paints structural steel framework of bridges; guard rack and cables of bridges; and all other surfaces requiring paint.

PAINTER, SPRAY.—Performs duties of the same nature as described under "Painter, Brush," except spray equipment is used.

PILEDRIVERMAN.—Rigs piledriving equipment, signals pile rig and guides pile and leads to point pile is driven, aligns and plumbs pile using tape and level during driving; splices piles before, during and after driving, cuts off piles, realigns piles after driving.

PIPELAYING.—*A semi-skilled laborer.*—Lays tile, concrete, corrugated metal pipe. Receives pipe lowered from top of trench; inserts spigot end of pipe into bell end of last laid pipe; adjusts pipe to line and grade; seals joints with cement or other sealing compound. May perform other related semi-skilled duties.

POWDERMAN-BLASTER-MAKEUP.—*A semi-skilled laborer.*—Supervises and assists in locating, loading, and firing blast holes for breaking up hard materials; enlarges bottom of drilled holes by discharging small quantities of explosives; inserts detonator in charge of explosive, attaching fuse or electric wires, the stick and detonator forming a primer, the discharge of which effects the discharge of the remainder of the explosive; charges hole by placing explosive, including stick that contains detonator, in hole and tamping with a pole; depresses handle of blasting machine or lights fuse to fire explosive. May use prima-cord or delay caps. May perform other related semi-skilled duties.

SCALER.—*A semi-skilled laborer.*—Cleans and dresses the slopes of roadway cuts and embankments while suspended by ropes or cables. Uses hand tools as required. May perform other related semi-skilled duties.

VIBRATOR MAN (HAND TYPE).—*A semi-skilled laborer.*—Lowers hose-like flexible shaft of vibrator into newly poured concrete. Starts powers unit and holds shaft, allowing hammerhead on shaft to vibrate, thus compacting the concrete. Air, electric, or gasoline operated vibrators are used. May perform other related semi-skilled duties.

WAGON DRILL OPERATOR.—*A semi-skilled laborer.*—Sets up and operates drilling mechanism that drills holes into concrete or rock. Levels machine by placing timbers under wheels. Inserts and fastens drill steel in chuck. Adjusts angle of drill tower and bolts into position. Controls drilling and speed of drill by moving levels. May oil, grease, or otherwise make necessary adjustments to equipment as needed. May perform other related semi-skilled duties.

WELDER—*A* TOOL OF THE TRADE.—Is capable of operating one or both electric welding apparatus and acetylene welding apparatus. Fuses metal parts together using either arc welding process or oxyacetylene method. Cuts, lays out, fits, and welds sheet metal, cast iron, and other metal or alloyed metal parts to fabricate or repair equipment. Welds together the joints between lengths of pipe for oil, gas or other types of pipelines. May perform other related duties.

Power Equipment Operators

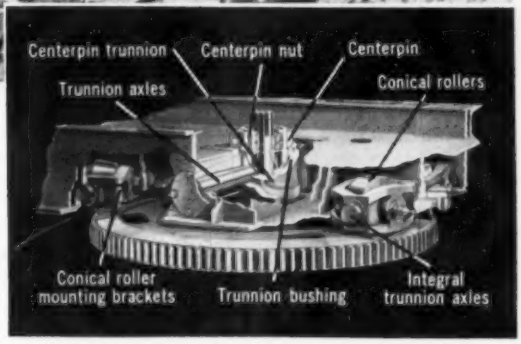
ASPHALT DISTRIBUTOR.—Sets spray bar and operates valves and levels at rear of truck to control distribution of oil or bituminous liquid for highway surfacing. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

ASPHALT FINISHING MACHINE.—Manipulates hand or foot levers to control movements of finishing machine that spreads and levels asphaltic concrete on highway. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

ASPHALT PLANTS.—Sets up and operates a large portable or stationary plant for mixing asphaltic materials and aggregate to produce asphaltic paving materials. Responsible for control of mixture. Regulates plant controls. May perform related duties. May clean, lubricate, and make repairs to equipment as needed. May oil, grease or otherwise service and make necessary adjustments to equipment as needed.

BULLDOZER.—Operates a tractor with a concave steel scraper blade

(Continued on page 118)



Exclusive centerpin trunnion and oscillating roller design eliminates concentrated centerpin loadings. Self-aligning centerpin trunnion distributes load evenly. Oscillating Conical rollers assure full-face contact with the roller path.

Put the shock in the rock...

come back for more!

TOUGH CUTS OR BRUTE LIFTS, BURLY 1½ TO 3-YD. K-MODELS OUT-MANEUVER SMALLER RIGS... OUT-PRODUCE LARGER MACHINES!

Always on top of the heavyweight jobs! Your operator in the cab of a Link-Belt Speeder King-size K-model *knows* he need *never* baby this machine!

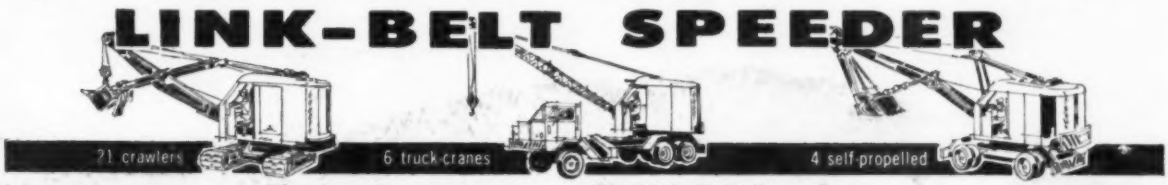
He feels the smooth surge of greater *usable* hp through hefty, extra-size shafts, gears and clutches. He socks the dipper in — rugged K-model structural members soak up the shock.

And K-models deliver these output-boosting advantages: Speed-o-Matic, the *true* power hydraulic controls . . . fast, effortless power hydraulic steer . . . *plus* bonus usable hp.

If you'd like more facts demonstrating how King-size K-models (1½ to 3-yd. capacity) outstrip the field, see your distributor or write Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

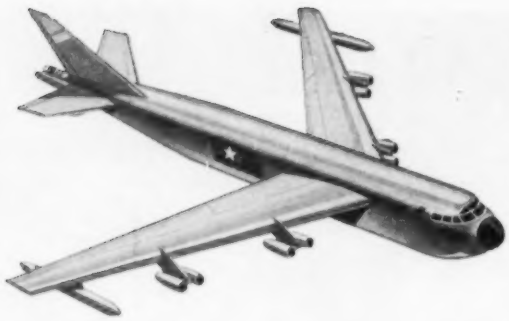
15,232-A

LINK-BELT SPEEDER



It's time to compare . . . with Link-Belt Speeder

. . . for more details circle 331 on enclosed return postal card



At Kinross Air Force Base...

helps the

THE "JET AGE" IS HERE. And with it is the problem of rebuilding airports to provide the longer, stronger, heavier runways these big jets need. That's why airport builders and designers are planning thicker, stronger airfield pavements with extra-heavy reinforcement . . . pavements that will match or exceed present jet requirements. And that's why the heaviest welded wire fabric ever produced was installed at the vital Kinross Air Force Base in Michigan.

Operational jets in commercial service now impose gear loadings in the neighborhood of 130,000 lbs., with gross weights of 295,000 lbs. Future models may go even higher. For that reason, only reinforced concrete provides the added strength to meet the unusually heavy and severe requirements of the "jet age." Specify USS American Welded Wire Fabric for reinforcing all runways, high speed turnoffs, taxiways, and service pads . . . get these important advantages:

- USS American Welded Wire Fabric distributes heavy wheel loadings over a larger area to prevent harmful overloads at any one point. Impact, shock, suddenly applied or released loads such as occur during landings and take-offs are more uniformly "absorbed" by each slab. Reinforced concrete slabs are 30% stronger than unreinforced slabs of equal thickness.
- USS American Welded Wire Fabric prevents harmful cracking from developing because of its uniformly spaced high-tensile-strength welded steel wire construction. Its action "knits" a slab together.
- USS American Welded Wire Fabric unifies the action of any slab when it expands and contracts due to temperature change.
- Longer, wider slabs can be laid when USS American Welded Wire Fabric is used. This means fewer joints, fewer load transfer assemblies. The reduction in the number of joints not only means economy, but also a smoother, safer landing surface.
- When existing airfield pavements must be strengthened, USS American Welded Wire Fabric reinforced concrete overlays will produce unbroken grade lines and provide additional strength. Thus, maximum economy is achieved.

Specify USS American Welded Wire Fabric. It's available in a wide variety of styles, lengths, and widths . . . in wire sizes from ½" diameter to 16 ga. and in longitudinal or transverse wire intervals of 2" to 16". The engineers at American Steel & Wire will be glad to tell you more about the application possibilities of fabric and how it can serve your needs. Get in touch with American Steel & Wire, Dept. 9301, 614 Superior Avenue, N.W., Cleveland 13, Ohio.

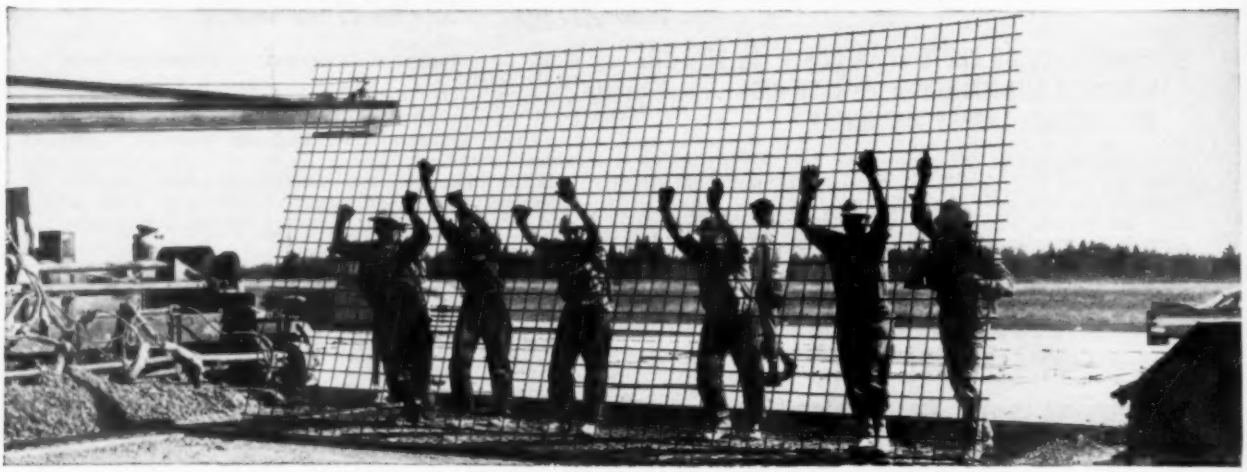
USS and American are registered trademarks

Contractor: Loselle Construction, Inc., Wyandotte, Michigan
Paving Material Supplier: Scioto Supply Company, Lansing, Michigan
Design and Supervision: Corps of Engineers, U. S. Army

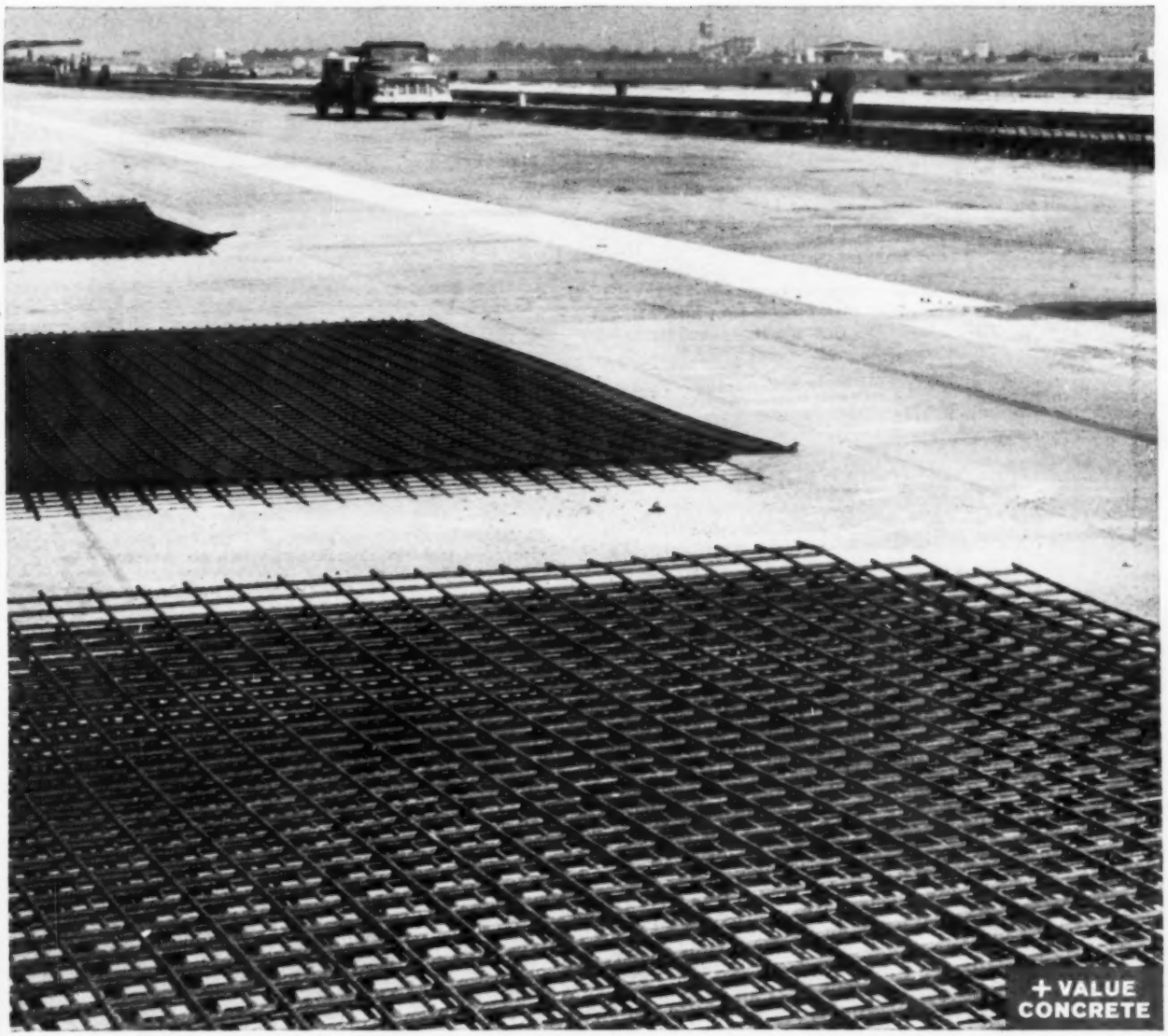
American Steel & Wire Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Alabama, Southern Distributors
United States Steel Export Company, Distributors Abroad

At Kinross Air Force Base, workmen are installing a section of USS American Welded Wire Fabric—Style 55-7/07/0 (7/0 Gauge is 0.490" Diameter Wires). USS American Welded Wire Fabric is entirely fabricated by electrically welding all intersections of the high strength steel wires. This insures positive placement of the steel in the slab and eliminates costly field tying and extra handling.



World's heaviest Welded Wire Fabric big jets land safely!



Under the direction of the U. S. Corps of Engineers, another new United States Air Force Base is made ready to join our air defense network. It is Kinross, located on the Upper Peninsula of Michigan. This base was expanded to handle bigger, heavier modern jet aircraft. USS American Welded Wire Fabric was used in the rigid overlays on the strengthened and lengthened runways.

USS American Welded Wire Fabric

. . . for more details circle 283 on enclosed return postal card

Girder Cast on Ground

150-foot post-tensioned concrete beams for a Chicago expressway bridge were cast in position, on submerged piers and abutments, then contractor dug out for underpass roadway beneath.

Post-tensioning tendon unwound from reel prior to placement in form. Concrete pad with 2 x 6 sleepers.

Cook County Highway officials as well as the contractors are pointing with pride to a bridge building idea carried out for a grade separation on Chicago's new Northwest Expressway.

The girders were cast in place on the ground, before excavating the site. This got around driving 900 25-ft. falsework piles and using 120,000 ft. of structural fir timber. Also of transporting the girders after casting. An estimated saving of two months was realized over the falsework method.

The bridge is the first major highway prestressed bridge in Illinois to be built by the post-tensioning method.

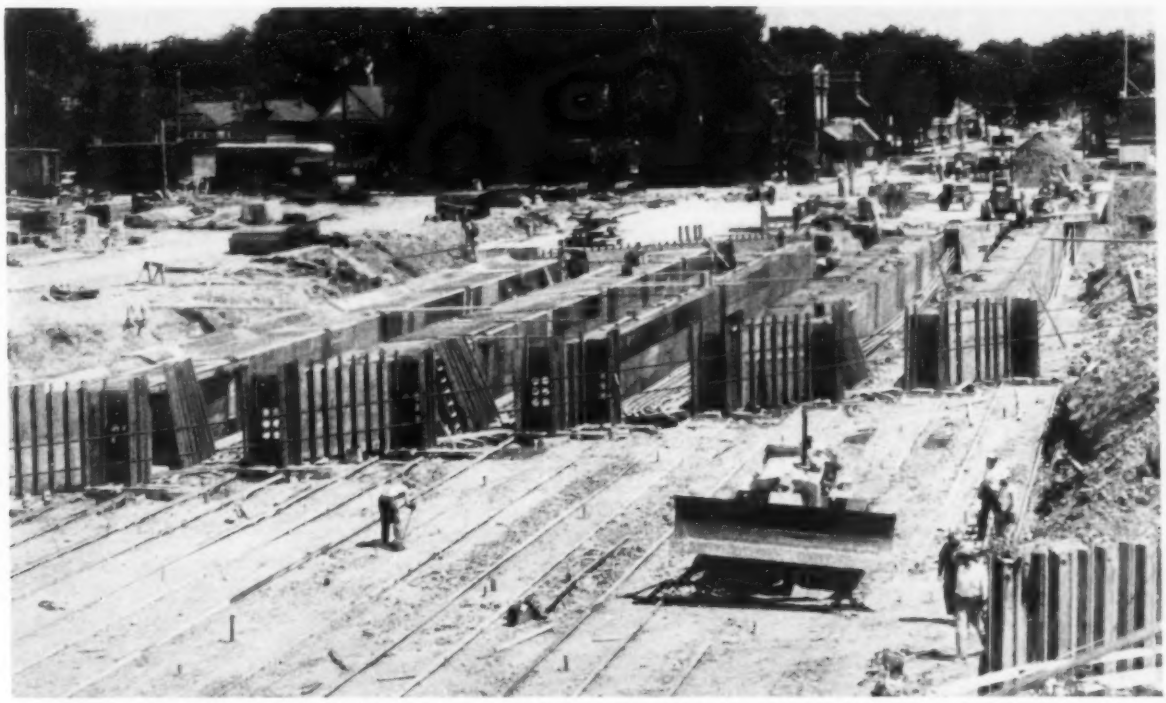
The structure, an "I" project built under Cook County direction, is located on Montrose Avenue on Chicago's northwest side. It forms a grade separation at the point where Edens Highway branches out from the Northwest Expressway to serve the northern suburbs. The 4-lane bridge is 462 ft. long and 81 ft. wide, including a 4-ft. median and two 8 ft. 6 in. sidewalks. Construction began in January of 1958 and the bridge was opened to traffic February 12, 1959. Total cost of the improvement was $1,069,623.

Excavating under the finished bridge. Two dozers bring spoil out to a dragline.

The job from the beginning:

The size (and weight) of the girders was the major obstacle confronting Thomas McQueen Co., the contractor. The bridge was to consist of two abutment spans, each 156 ft. long, and one center span of 152 ft., with a depth of 7 ft. 1½ in. for each of the 30 girders. Since moving beams of this size through city streets was a prospect to be avoided, McQueen's superintendent Philip Joy "got an idea" and suggested density tests of the soil at the site. When these tests proved the material be a clay with considerable load-bearing properties, the decision was made to cast the girders in

And Under-Excavated



Overall view of Montrose Avenue bridge during early construction stages. Center span is formed and tendons are in place.

place, excavating under girders and deck as a final step. Besides ruling out transport difficulties, this procedure would also eliminate all need of falsework for support.

Excavation was made for the abutments and piers only; their forms were placed and concrete poured. After these forms were stripped, 5,000 cu. yd. of granular backfill material was deposited around the structures in 12-in. lifts and compacted by the weight of an Allis-Chalmers HD-5 tractor loader.

A Caterpillar 12 motor grader then came in to grade the ground as a foundation for formwork. Before setting up forms, the supporting ground under each girder was topped with a continuous, non-reinforced concrete pad 42 in. wide and 4 in. thick. The purpose of the pads was twofold: to permit maximum distribution of load across the supporting ground and to take out surface irregularities. Form timbers bearing directly on earth would not be uniformly supported under heavy weight.

Transverse 2 x 6 in. sleepers were laid at 2-ft. centers on the pads for support of the beam bottoms. The pads were temporary and came out when the dirt was excavated.

The girders were not formed to their final exact grades, the effect of tensioning in mind. With an upward deflection of 2 in. expected at the time of post-tensioning, the forms were built so that this 2 in. rise would bring the structure to its theoretical grade. Since girders and bridge deck were monolithic on this job, the deck forms were also placed at this time.

Subcontractor for the post-tensioning was Joseph T. Ryerson & Son, Inc. The girders contain 7 tendons each, composed of cold drawn and stress relieved steel wires made by American Steel and Wire Company. They were enclosed in conduits manufactured by Universal Metal Hose Company.

Ready-mix concrete was delivered to two Blaw-Know 1¼-yd. buckets handled to the forms by two Lorain 820 cranes. The girders were filled progressively in three lifts, with vibration being done by 6 Mall 1½-hp electric vibrators with 1⅜-in. diameter heads.

The 7-in. deck was poured in the normal manner after re-vibration of the girders and the deck concrete was vibrated with 3 Mall 3-hp electric units with 2¼-in. heads. The McQueen crews averaged 500 cu. yd. for a 9-hour day, taking 6 pours for the 3 spans.

When three days had passed, at which point the girder concrete had reached a compressive strength of 4,000 psi, the initial stress was applied. This tensioning, about 10 percent of the ultimate stress, was applied to the top two tendons and the single one at the bottom. Pur-

pose of this step was to eliminate the possibility of shrinkage cracks.

By use of an additive (Sika Chemical Corporation's "Plastiment") curing time for the girders was reduced to approximately ten days. Then with concrete strength at 5,000 psi the ultimate stressing was done.

The equipment was two W. S. Pine portable 200-ton hydraulic jacks which exerted a force of 8,000 psi on a 50-sq. in piston. When the recessed anchor head was pulled into position past the bearing plate, stretching all wires simultaneously and producing the desired prestressing force, a lock nut was screwed on to hold the anchor head in place and the pull bar was removed.

After some difficulty at first in getting pumps to produce sufficient hydraulic pressure, McQueen worked out an efficient system on the jacks, and needed only an average 5 minutes to bring the wires out 11 in. to their final tensioning.

Under-Excavating. With the depressed Northwest Expressway passing beneath the Montrose Avenue bridge, a pit was excavated alongside the structure to the grade of the new highway immediately after pouring of each span. Enough berm was left to maintain support of the bridge. After the span was tensioned, two Caterpillar D8s rooted earth from beneath the structure.

The spoil then was loaded by dragline into trucks. The bulldozers worked in tandem to an 8-ft. depth under the girders, making the final cut when more working space was attained.

Superintendent Joy declares that when soil conditions permit this type of construction it can contribute much to such jobs as this one. Besides saving time, the simplicity of this method also enhanced safety on the Montrose bridge operation, with the men working on the ground to build the forms instead of clambering over falsework. Other tasks were facilitated too; cranes, for example, were able to work close up to the structure at the deck grade.

Cook County Highway officials associated with the Montrose Avenue bridge: William J. Mortimer, superintendent of highways; Hugo J. Stark, chief engineer; Milton Page, bridge engineer; Royal O. Mortenson, engineer of bridge construction; Edmund Morrissey, resident engineer.

WORKERS JOB CLASSIFIED

(Continued from page 112)

mounted in front of the chassis to level, distribute, and push earth; regulates height of blade from the ground. Uses tractor as a pusher in loading earth carrying equipment. May oil, greas, or otherwise service and make minor repairs to equipment as needed. May perform other related duties.

CONCRETE PAVING FINISHING MACHINE.—Operates a self-propelled machine which travels on concrete paving forms and levels fresh concrete to approximate grade and contour by pushing and pulling two (2) screeds over the surface. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

CONCRETE PAVING GANG VIBRATOR.—Operates a self-propelled machine which travels on concrete paving forms and operates levers to lower multiple vibrator heads into freshly poured concrete, allowing head on vibrator to vibrate, thus packing concrete. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

CONCRETE PAVING LONGITUDINAL FLOAT.—Operates a self-propelled machine which travels on concrete paving forms and moves levers to properly strike off the concrete to correct elevation. Machine has one (1) screed traveling longitudinally. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

CRANE, BACKHOE, CLAMSHELL.—Dragline, Shovel (Under ¾ C.Y.).—General term applied to operator of boom type equipment to hoist and move materials, raise and lower heavy weights, and perform other related operations. Workers are classified according to the type of machine or attachment being used, location of machine or work performed; i.e., clamshell operator is so designated when machine is equipped with hinged type bucket attachment. Such equipment is used for excavation, pouring concrete, setting steel, or other miscellaneous tasks for which crane or stick type equipment is required. May include hoist operations. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

CRANE, BACKHOE, CLAMSHELL, DRAGLINE, SHOVEL (¾ TO 3 C. Y.).—Performs duties of the same nature as described under ¾ C.Y.)."

CRANE, BACKHOE, CLAMSHELL, DRAGLINE, SHOVEL (OVER 3 C. Y.).—Performs duties of the same nature as described under "Crane, etc. (under ¾ C.Y.)."

CRUSHING AND SCREENING PLANT.—Operates a crusher or screening plant through which broken rock is run to break it into crushed stone for construction work, or to control flow of materials through screening plant to screen out materials not needed; regulates flow of rock through chute to crusher. May perform other related work. May clean, lubricate, and make minor repairs to crusher as needed. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed.

FIREMAN.—Hand strokes, or fires by gas or oil, a portable or semi-portable steam boiler, such as is used on steam shovels, pile drivers, cranes, dredges, hoisting equipment, and asphalt plants. May perform other related duties.

FRONT END LOADER (1½ C.Y. AND LESS).—Operates a rubber-tired or crawler type tractor with an attached scoop type bucket on front end. Moves levers to raise and lower bucket and dump contents of bucket. Machine is used to load materials from stockpiles, excavation, charging batch plants, loading trucks. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

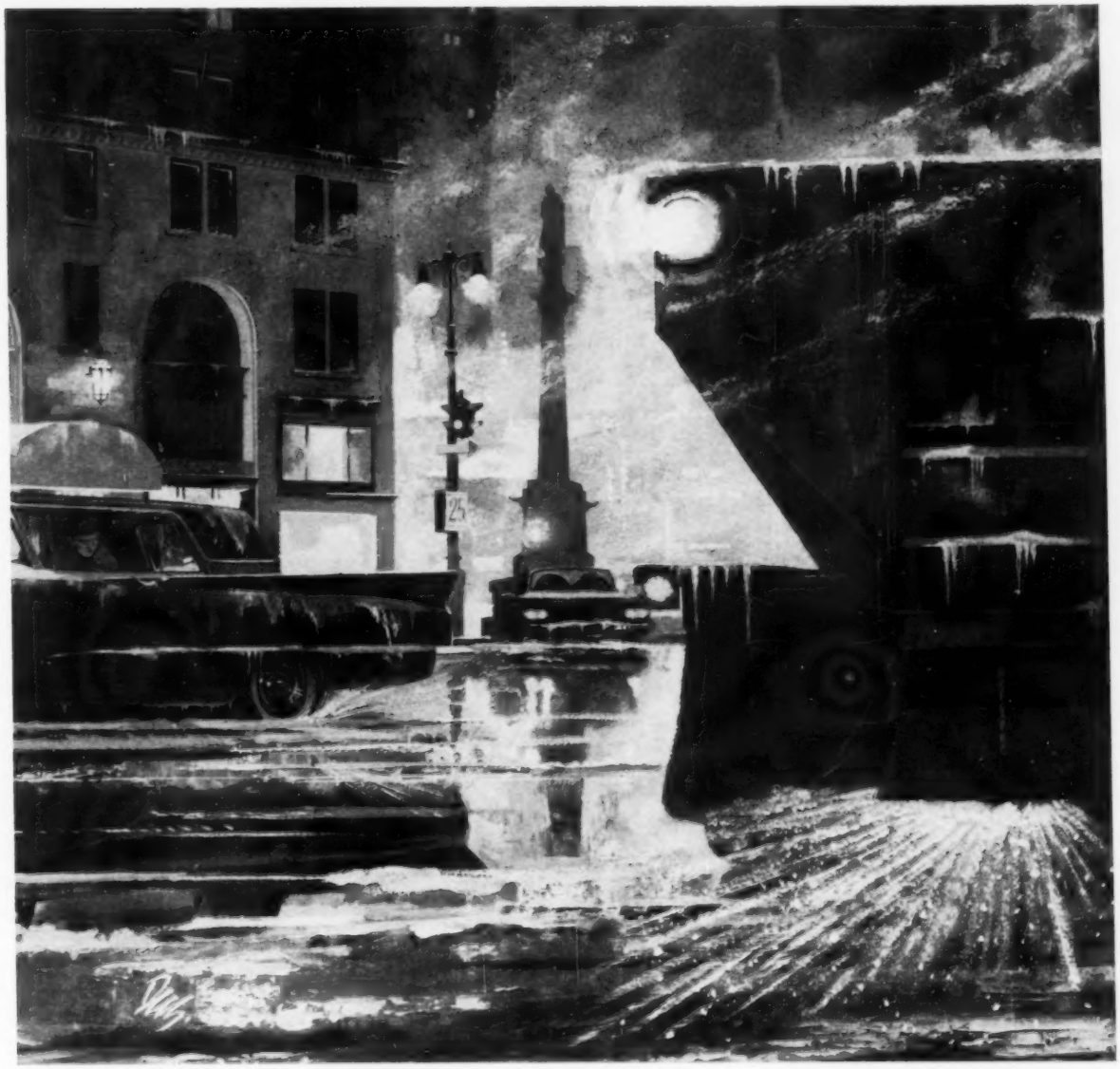
MECHANIC.—Assembles, sets up, adjusts, and maintains and repairs all type of construction equipment, such as internal combustion engines, air compressors, pumps, concrete mixers, heavy earth moving equipment, rock crushers, paving equipment. He may perform the duties of a welder in repair of equipment. May perform other related duties.

MIXER, CONCRETE (1 C.Y. AND LESS).—Operates a small, portable concrete mixing machine to mix sand, gravel, cement and water to make concrete. Starts power unit and does or oversees loading of materials. Controls the mixing by

(Continued on page 176)

The lower the temperature...

the wiser you are to use straight Sterling Rock Salt for ice control



Fact: Straight Sterling Rock Salt has effective melting power at temperatures ranging from 32° F. to below zero! All that's necessary is to increase the amount of rock salt used as the temperature drops—just as you use more fuel to heat your home when it gets colder outside. For example, today many road men use about one-third more Sterling Rock Salt (straight) when the temperature falls below 20° F. This provides the bare, safe pavements which are so essential during winter storms!

International Salt Co., Scranton, Pa. • Boston • Buffalo • Charlotte • Chicago • Cincinnati • Cleveland • Detroit • Newark • New York City • Philadelphia • Pittsburgh • St. Louis.

STERLING "AUGER-ACTION" ROCK SALT

INTERNATIONAL SALT COMPANY, INC.

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YARDS

ON

MODEL CW-220
20.0 cu. yds. STRUCK
27.0 cu. yds. HEAPED
INTERCHANGEABLE WITH MODEL CWD-221 REAR DUMP UNIT

MODEL CW-215
15.0 cu. yds. STRUCK
21.0 cu. yds. HEAPED
INTERCHANGEABLE WITH MODEL CWD-214 REAR DUMP UNIT

MODEL CW-27
7.0 cu. yds. STRUCK
10.0 cu. yds. HEAPED

MODEL CW-226
26.0 cu. yds. STRUCK
36.0 cu. yds. HEAPED

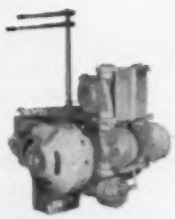
MODEL CW-320
20.0 cu. yds. STRUCK
27.0 cu. yds. HEAPED
INTERCHANGEABLE WITH MODEL CWD-321 REAR DUMP UNIT

MODEL CWD-221
21.0 cu. yds. STRUCK
31.0 cu. yds. HEAPED
35-TON LOAD CAPACITY
INTERCHANGEABLE WITH MODELS:-CW-220

MODEL CWT-20
20.0 cu. yds. STRUCK
27.0 cu. yds. HEAPED

INTERCHANGEABLE WITH MODEL CW-220 SCRAPER UNIT

MODEL CWD-321
21.0 cu. yds. STRUCK
31.0 cu. yds. HEAPED
35-TON LOAD CAPACITY



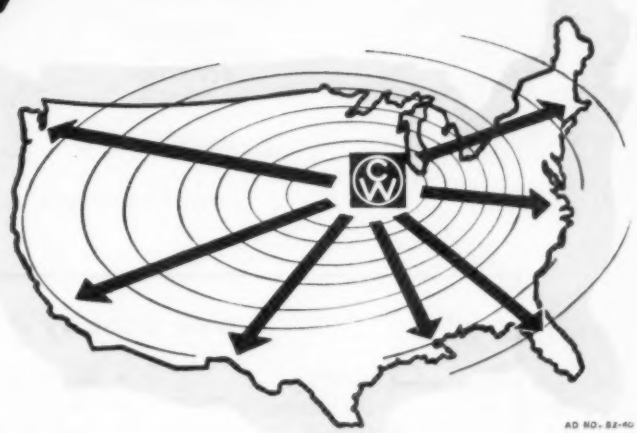
CABLE CONTROLS
for standard tractors in every horsepower range

AHEAD

ANY EARTHMOVING JOB ...The Curtiss-Wright Line

Let's skip the details and get down to basic facts about earthmovers. If you move more dirt, you make more money — it's as simple as that . . . and just about as easy, too, with the modern Curtiss-Wright line. C-W design features for high performance, easy operation and low maintenance put you yards ahead in production — dollars ahead in profit on any earthmoving job. Call your Curtiss-Wright distributor for complete information and specs on the machine performance matched to your job requirements.

Your local Curtiss-Wright distributor is part of a nationwide sales, parts and service network devoted to making Curtiss-Wright users the most satisfied in the industry. You can depend on him for the most efficient, most cooperative service that it is possible to provide.



AD NO. 52-40

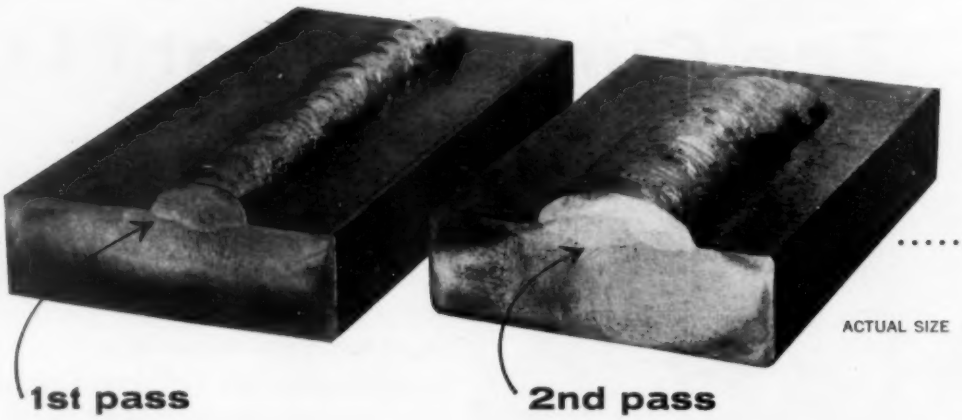
SOUTH BEND DIVISION, CURTISS-WRIGHT CORPORATION • SOUTH BEND, INDIANA

SOUTH BEND DIVISION
CURTISS-WRIGHT CORPORATION
SOUTH BEND, INDIANA

. . . for more details circle 301 on enclosed return postal card

STOODY BUILD-UP

(Iron Powder Coating)



Compare the new Stoody Build-Up with any other material of this type. It gives you:

SPEED.....15% to 50% faster deposit rate

BUILD-UP.....Higher—with sound deposits

ECONOMY.....High welding efficiency gives lower cost per pound of deposit

WELDABILITY.....Stable arc—low spatter—less smoke

OTHER FEATURES....Higher tensile strength—low crack sensitivity—excellent machinability

Use Stoody Build-Up for

- Shafts (to be machined)
- Gear Teeth
- Sprockets
- Tractor Rails
- Churn Drills
- Build-up on carbon steels for hard-facing overlay

See your Stoody dealer for complete information (check the Yellow Pages of your phone book) or write to

STOODY COMPANY
11908 East Slauson Avenue • Whittier, California

. . . for more details circle 352 on enclosed return postal card

Multi-Duty Lube Outfit

Ten hose lines dispense "everything but Coca Cola" to help keep a 45-unit fleet moving dirt. Note hinged flood lights in the van wall (see text for details).

The big lube and servicing station-on-wheels, pictured here, handled most of the chores for a 45-unit earthmoving fleet this past summer. The outfit reflects its owners' belief that "PM" is worth doing right, with clean materials and efficiency aids, and therefore justifies good equipment for the purpose.

The project is that of American Construction Company, of Cleveland, Ohio. This firm subbed from Bates & Rogers Corporation the 2,800,000 cubic yards of earthmoving for a 5-mile segment of Ohio Interstate "Route 1." During the summer the firm moved 30,000 and as high as 44,000 cubic yards per two-shift day, despite wet clay conditons and rather long hauls. A good downtime record is credited to equipment care.

Doing most of the servicing for this fleet, the lube van here pictured was designed and built by Aro Equipment Corp. to the ideas of the contractor. Here are some of the features:

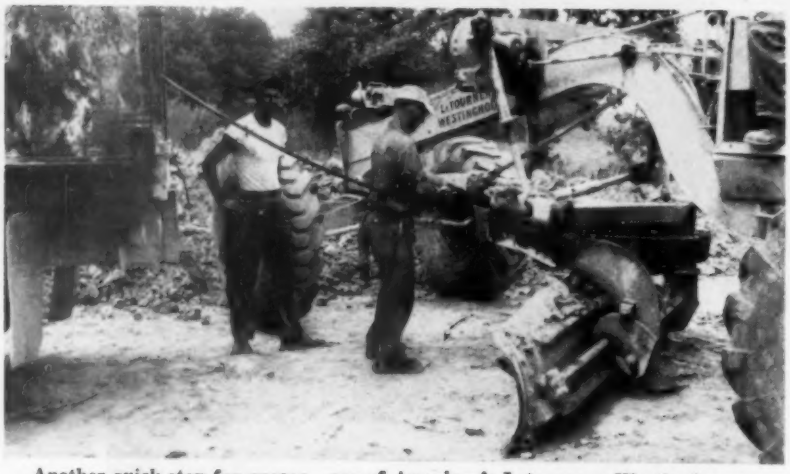
1. The truck is an International S-170 with dual tandem rear wheels, Browning 3-speed transmission, with locking of all four rear wheels. The weather-proof steel body was built by Schaefer Body, Inc.

2. Hose reels, left rear, include lines for S1-20 engine oil (for Allis-Chalmers tractors), gear 90 oil, S-3 20 high-detergent engine oil (for Cat D9s and other turbo-charged machines), and track roller grease.

Reels on the right rear are for compressed air, water (via 250-gal. square tank), chassis lubricant, hydraulic oil, and 50-weight gear oil. This makes ten hose lines in all.

3. Nested back of the reels are four rectangular tanks carrying a storage supply of SA 50, hydraulic oil SEA 20 and SAE 90. This storage assures uninterrupted servicing despite irregular deliveries.

An International Payhauler stops along the haul road for a quick greasing. In a few minutes, on his way.



Another quick stop for grease—one of American's Letourneau-Westinghouse motor graders.

Richard Ward and Ralph Peel on day-shift are proud of their Aro lube outfit and help keep everything "clean enough to eat off of."

4. On forward, there are two 54-gal. drums with mounted pumps, for track roller lubricant and chassis grease—more emergency protection.

5. Next you find assorted 5-gal. cans of special materials such as high-temperature grease for electric steering motors on the Tournapulls, volt oil for rectifiers, automatic transmission oil, solvent for cleaning, and air cleaner oil.

6. Along the right wall is a ceiling-high, dust-proof cabinet. This holds 300-odd air filters for various machines—a real delay-saver on the job, according to the crewmen.

7. Clear forward there is a Champion Pneumatic compressor, which automatically maintains 120-160 psi and vents through the roof; and an Aro Model 7702 crane, mounted on a rail extending the length of the ceiling.

8. Floodlights are powered by an Onan generator. Two 500-watt lights are carried on the rear. And on either side are two 500-watt lights, hinge-mounted in the body wall in such a manner that illumination can be directed either outside or inside the truck body.

9. Miscellaneous equipment includes a Pyrene fire extinguisher, four hand grease guns (one with long "ant eater" spout for getting at steering clutches, etc.), wire hand brushes for cleaning the stacks over air filters. And, oh yes, push buttons are mounted on the rear door sill for starting and stopping the compressor or turning on the lights.

The two-man day crew is here pictured during a rapid-fire greasing of haulers, graders, scrapers and tractors along a 4,000 foot haulroad where the unit was stationed for several hours.

All lubrication including regular 5-day engine oil changes and other periodic attention are recorded on a "PM" sheet carried in the cab. This sheet gives the servicing history of every machine on the project.

In charge for American Construction Company under vice-president Hansen E. Greene is Al Meister, general superintendent.

A NEW PLAN FOR INSTALLMENT SALES is announced by Pettibone-Mulliken Corp. Products to be covered include tractors, speedloaders, portable gravel plants, portable cement mixers, loaders, graders, and other heavy material handling equipment used in road building, construction, logging, and mining. The plan will be administered by James Talcott, Inc., one of the nation's oldest financing institutions.

Concrete streets like Crescent Drive are a joy to motorists

425 blocks paved in 8 years

Duncan, Oklahoma, chose concrete to get streets good for 50 years and more!

Cities and villages everywhere are finding that concrete is the popular and economical answer for street improvement programs. Duncan, Oklahoma, for example. Early in 1951 its Chamber of Commerce appointed a committee. They worked with the mayor and city commission on a master paving program for Duncan streets.

They studied pavement costs and life expectancy, learned that concrete is the one pavement with load-bearing strength that can be computed mathematically to match future traffic, last 50 years and more. Records showed that upkeep costs for concrete run as much as 60% lower than for asphalt.

All this was explained to Duncan property owners at special meetings. And with enthusiastic approval from cost-conscious taxpayers, the committee's decision was unanimous for concrete! Since then it has been concrete all the way for Duncan.

City officials and Duncan citizens are proud of their modern concrete streets . . . clean, bright and attractive. Smooth-riding. And with the extra safety of concrete's skid-resisting surface and high night visibility.

Thrifty concrete is the preferred pavement for streets everywhere, with true economy for taxpayers, both today and in the future. If you are planning a street paving program, write for free literature—technical and non-technical. Distributed only in the U.S. and Canada.

PORTLAND CEMENT ASSOCIATION

Dept. A10-28, 33 West Grand Ave., Chicago 10, Illinois

A national organization to improve and extend the uses of concrete

MODERN Concrete

Spot loads easier, more accurately with GAR WOOD

Gar Wood's 20- and 25-ton truck cranes, the most modern on the market, are engineered throughout for fast, precision control. You can spot a load with amazing speed and accuracy!

Gar Wood's direct gear drive delivers a smooth flow of power, without troublesome backlash. The operator puts this power to work: *easily*—because drum clutches are power-actuated... *accurately*—because direct manual controls retain operator "feel" ... *safely*—because worm-driven boom hoist provides two speeds up and two speeds down.

In addition, Gar Wood truck cranes offer full range visibility ... give the operator a "control tower" view for maximum safety and accuracy.

Gar Wood, the high-performance truck crane, can do more kinds of jobs ... faster ... at lower cost. Have your nearby Gar Wood dealer prove it to you soon ... with more information and an on-the-job demonstration.

ADVANCED FEATURES ARE "STANDARD EQUIPMENT"

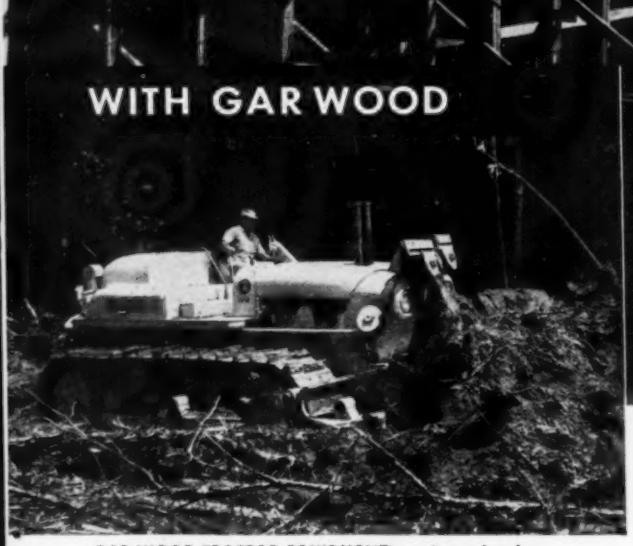
GAR WOOD-BUCKEYE DITCHERS give you modern "extras" that pay off in increased production, ease of operation and low maintenance costs. Wheel-type ditchers feature hydraulic conveyor drive with three speeds in either direction, simplified group controls, "ditcher designed" transmission and hydraulic digging wheel hoist as standard equipment at no extra cost.

GAR WOOD-ST. PAUL builds the most advanced and complete line of arm-type underbody and front-mounted telescopic hoists, with matching bodies for every job requirement. Sold and serviced by the world's largest truck equipment distributor organization.

TRUCK CRANES

GarWood
INDUSTRIES, INC.
Findlay, Ohio • Wayne, Michigan

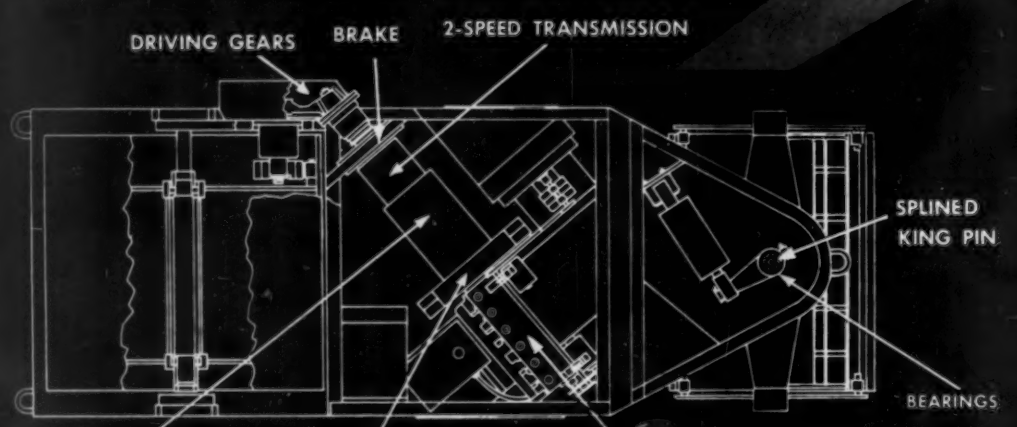
WITH GAR WOOD



GAR WOOD TRACTOR EQUIPMENT is engineered exclusively for the extra "work-ability" of the world's most powerful tractor—the Euclid TC-12. Gar Wood equipment includes front- and rear-mounted cable control units, Tipdozers, Dozecasters and Rippers.

. . . for more details circle 314 on enclosed return postal card

NEW DIRECT-IN-LINE DRIVE GIVES YOU FULL POWER...



in these

SEAMAN-ANDWALL STĀ-BILT STEEL WHEEL ROLLERS

The roller built with the maintenance man in mind...

5-8 TON AND 8-12 TON STEEL WHEEL ROLLERS
(GASOLINE POWERED)

The power-train from engine to roll drive is direct, an engineering feature attained by a diagonal mounting of the engine and torque converter transmission between the drive and guide rolls. No power-robbing chains, jackshafts, belts or right angle drives.

Another exclusive feature: heavy KING PIN is not only splined but is also clamped securely to the steering sector of the guide roll to completely eliminate side movement of the roller.

Four large access doors to the engine and control compartments as well as a drive roll door make access quick and easy.

Let us tell you more about the STĀ-BILT Rollers — the most modern in service today.

SEAMAN-ANDWALL CORPORATION
A Subsidiary of American-Marietta Company
ELM GROVE 11, WISCONSIN

7076

. . . for more details circle 349 on enclosed return postal card

The right design, the right steel, the right shape make *ESCO* Points and Adapters right for every digging condition.

The construction industry looks to

ESCO®

Electric Steel Foundry Co., PORTLAND, OREGON

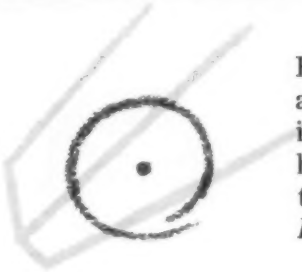
See reverse for shapes and size range

Here are the points to remember...

12M ALLOY STEEL

ESCO 12M Points are the toughest you can buy. Developed through years of research for the construction industry, cast *ESCO* 12M is carefully heat treated to produce the finest steel made for the severe shock and abrasion encountered by points and adapters.

RIGID QUALITY CONTROL TESTS ASSURE TOUGHNESS, HARDNESS



Every *ESCO* Point is Brinell tested to assure the exact degree of shock-absorbing toughness and abrasion-resisting hardness for longer digging life. Be sure to look for the Brinell mark on every *ESCO* Point you buy.

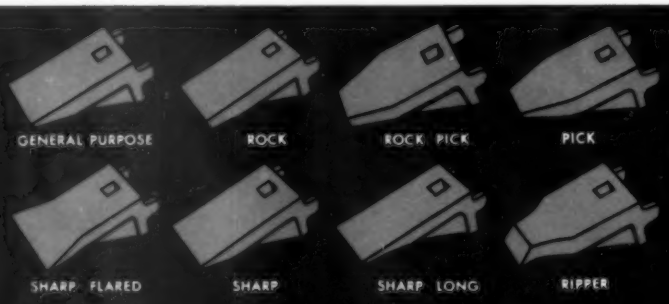
8 POINT SHAPES

You can select from eight different shapes to find the point that matches your digging conditions. *ESCO* Points are designed by bucket and excavation specialists who know how to achieve top digging performance. The self sharpening design of an *ESCO* Point makes it start sharp and stay sharp.

ESCO Points and Adapters for all digging equipment

Your local ESCO dealer can supply Points and Adapters for all your digging needs. By using ESCO Points and Adapters on all your equipment you can cut costs further by reducing your point inventory and consolidating purchases. Call your ESCO dealer today for details. He's listed in the yellow pages of your telephone directory. Or, write direct.

LITHO IN U.S.A.



ESCO Point shapes . . . start sharp, stay sharp and last longer under any digging condition.

ESCO

Electric Steel Foundry Company
2155 N. W. 25TH AVE. • PORTLAND 10, OREGON

MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.
Offices in Most Principal Cities
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New Products

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To readers outside of the United States—Sorry, postal rules forbid use of business reply cards outside of the U.S. Please write to us listing the numbers, month and name of magazine, and mail with your name and address to Inquiry Dept., Roads and Streets, 22 W. Maple St., Chicago 10, Ill., U.S.A.

Madsen Portable Stabilizer Plant

Stabilizer Plant

Madsen Works, Division of Baldwin-Lima-Hamilton Corporation, announces a new Model 567 portable highway-airport base stabilizer plant. Many innovations have been incorporated into this plant, it is said, with particular emphasis on ease of erection and dismantling, mechanical simplicity, high production, and precision proportioning and control of cement and water going into the mix.

The pugmill mixer used is a twin-shaft continuous type designed for producing approximately 600 tons per hour of stabilized base. Long-life segmented mixer liners are used which may be quickly removed when replacement is necessary. A new push-pull gate controls the mixing pressure by maintaining a constant and desired depth of material in the pugmill. The plant is so designed that the cold feed can be brought into the mixer on either side of the plant or at the end.

Madsen Works, Division of Baldwin-Lima-Hamilton Corporation, P. O. Box 38, La Mirada, Calif., and Lima, Ohio.

For more details circle 101 on Enclosed Return Postal Card.

335 hp Tractor

Caterpillar Tractor Co., has announced the availability of a new Series D9 tractor. Designated the D9 Series E tractor, the new unit will be available in a choice of direct drive or torque converter drive, as well as the power shift version.

The addition of a more efficient turbocharger contributes to an increase in machine horsepower, now up to 335 hp, compared to the previous 320. Dimensionally, the new machine is 1-7/16 in. longer, 1 in. higher, and of the same width as its predecessor. Improvements in the new D9 tractor are concentrated in the under carriage components. The track group is completely new and is characterized by dimensional increases and strengthening of all components. Service life of the shoe has been lengthened by increasing grouser height from 3-1/16 in. to 3-7/16 in. Track bolt diameter has been increased from 7/8 in. to 1 in. increasing strength 23 percent, it is claimed.

Caterpillar Tractor Company, Peoria, Ill.

For more details circle 102 on Enclosed Return Postal Card.

Additive For Concrete

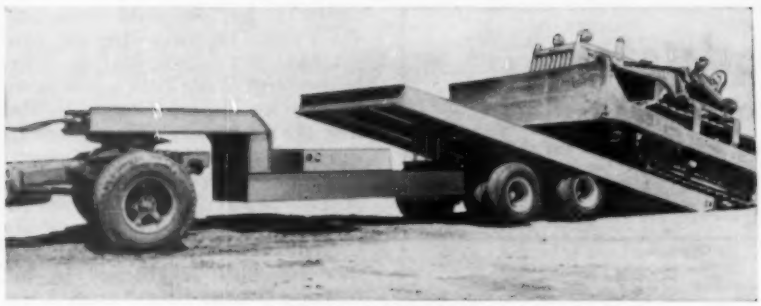
Multiwet #50 is a new formulation developed by Deynor Corporation and said to improve quality and workability and reduce cost of concrete. The product is a highly concentrated, balanced, liquid compound of basic "multiphase" wetting elements that is added to the dry mix (cement, sand and coarse aggregate) at the rate of 4 oz. per cu. yd., before the mixing water is added. The cost is less than 7 cents per cu. yd.

It first acts on the inherent moisture in the aggregates and then on the added mixing water, thereby completely hydrating all the cement and thoroughly "wetting" the aggregate. About 15 percent less water is required for the same slump. Better plasticity is attained resulting in more workable concrete, strength is increased and 3½ percent air entrainment results, the manufacturer states. For the same strength of the designed mix, cement can be reduced.

Deynor Corporation, 1 Depot Plaza, Mamaroneck, N. Y.

For more details circle 103 on Enclosed Return Postal Card.

Cat D9 Tractor



Miller Semi-Tilt Trailer

Semi-Tilt Trailer

Fast, safe loading of large construction equipment is claimed for a new semi-tilt trailer designated the "OTS" by Miller Tilt Top Trailer, Inc. This unit brings many loading advantages, such as speed and safety associated with tilt trailers, to heavy equipment formerly handled only on "low-boy" type trailers, the manufacturer states. Large platform area and 22-ton capacity are combined with an extra low, completely flat, over-the-wheels platform that is said to eliminate the "beaver-tail" type of platform. These platform advantages of the "OTS" are made possible, the manufacturer reports, by employing a separate "tongue-frame" pivoting the platform near rear wheels. The tilting section is available in an 8 ft. width x 16 ft. length or a 20 ft. length. The stationary section adds another 4 ft. of length to either size.

Miller Tilt-Top Trailer, Inc., 473 S. 92nd St., Milwaukee 14, Wis.

For more details circle 104 on Enclosed Return Postal Card.

500 tph Crushing Plant

A new Cedarapids Tandem crushing and screening plant announced by Iowa Manufacturing Company follows the design of the Cedarapids "Commander" plant but incorporates larger components to give it a capacity of up to 500 tons per hour of 1 to 4 product sizes.

Principal component in the plant is the 12 in. x 36 in. twin jaw crusher which is said to give the plant 40 to 100 percent more primary crushing capacity. The "Super Commander" has a big 48 in. x 14 ft. horizontal triple deck vibrating screen that gives it 40 percent more screening capacity than the "Commander." The elevating return wheel is 12 in. larger in diameter and 5 in. wider and the conveyors are 36 in. or 6 in. wider, to handle the greater circulating load of the plant. When necessary the plant can be fitted with a third air suspension axle that will carry a load equal to the tandem axles and reduce axle load to under 18,000 lb. With the feeder and hopper removed, weight on each of the three axles is under 16,000 lb.

Iowa Manufacturing Company, Cedar Rapids, Iowa

For more details circle 105 on Enclosed Return Postal Card.

Cedarapids Super Commander

Brake Attachment

An attachment for air brake systems called the "Maxibrake" is announced by Maxibrake, Inc. The unit is placed between the service brake chamber and its mounting bracket to provide an automatic, mechanical application of the brake when the normal air supply is depleted through extreme brake use or other causes.

When the service brake air supply drops below a predetermined pressure, the "Maxibrake" is said to take over automatically. The brake is an air released-spring applied device which does not affect the operation of the service brakes if the reservoir air pressure is adequate to fully compress the attachment springs.

Maxibrake, Inc., P.O. Box 2362, Terminal Annex, Los Angeles 54, Calif.

For more details circle 106 on Enclosed Return Postal Card.

Dual Motor Vibrator

Cleveland Vibrator Company announces a new dual motor vibrator geared for synchronous action. Model RC-31 produces straight line vibration in any direction, operates on a rotating eccentric weight permitting force of vibration to be varied without changing weights. There are four weights, two on each motor, contra-rotating. Variable impact range is from 640 to 2,200 lb. and any impact change can be made quickly, the maker states. Because there are no pulleys or belts within this enclosed vibrator, operation is extra quiet, according to the manufacturer. Specifics include: weight, 100 lb. dimensions: width 12⅝ in., length 12⁹⁄₁₆ in. and thickness 7⅛ in. Input is 1000 watts, with 220 volt, a-c., 3-phase, 60-cycle power.

The Cleveland Vibrator Company, c/o The Wellman Company, 508 Public Square Bldg., Cleveland 13, Ohio

For more details circle 107 on Enclosed Return Postal Card.

Bituminous Distributors

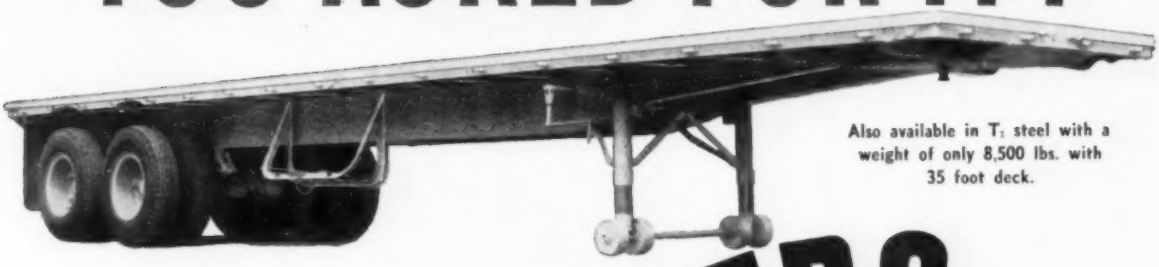
A new line of bituminous distributors in 400, 600, and 800 gallon sizes has been announced by Aeroil Products Company, Inc. These units are furnished as trailors or on skids for truck mounting and utilize circulating or non-circulating spray bars; hand spray is also included for patching.

The distributor is self-filling at a rate of 100 gpm. One or more hand sprays can be used from the unit and draw-off cock allows filling of pouring pots by gravity feed, eliminating the necessity of starting the motor. After basic unit is purchased, component parts and accessories can be added as desired.

Aeroil Products Company, Inc., Wesley St., South Hackensack, N. J.

For more details circle 108 on Enclosed Return Postal Card.

YOU ASKED FOR IT!



Also available in T1 steel with a weight of only 8,500 lbs. with 35 foot deck.

SO! ...here's the ROGERS HIGH-FLAT

Persistently for years, from various sources, have come requests for Rogers Brothers to build high-flat trailers.

Finally they have yielded and produced a trailer that meets every need and is worthy of carrying the Rogers name.

In keeping with Rogers consistent policy, these trailers have been so designed to give maximum performance and so constructed to assure long service with minimum maintenance.

Factors include: proper proportioning and balance, resilient springing, dependable braking and the use of a newly developed framing steel.

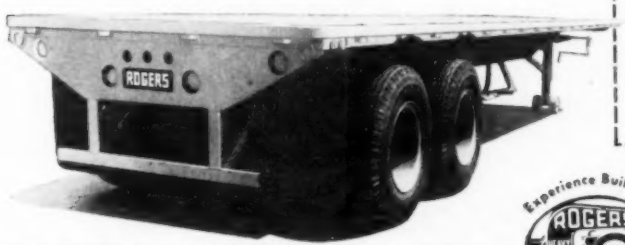
The spring mounted bogie has been proved in thousands of miles of gruelling service.

The liberal sized, reliable brakes are of time-tested Rogers design.

Of special interest is the T1 frame steel — a new product combining the strength of high quality steel with uncommon lightness.

No longer need truckers haul excessive dead weight to obtain required strength in their high-flat trailers.

Get complete information from your Rogers distributor or contact the factory directly. Use the coupon.



FILL IN — CLIP OUT AND MAIL

ROGERS BROS CORP.
Albion, Penna. Date_____

Send literature and complete information regarding HIGH-FLATS.

Name_____

Company_____

Street Address_____

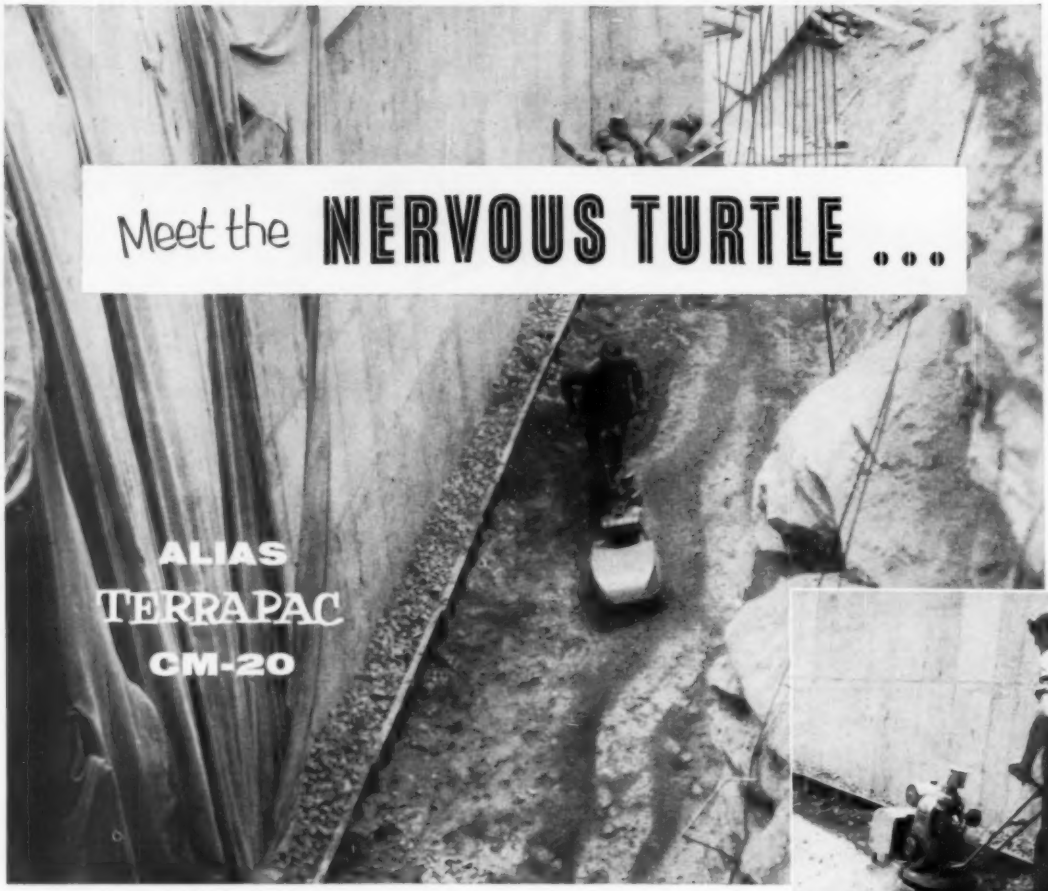
City_____

ROGERS BROTHERS CORP.
ALBION, PENNSYLVANIA

Experience Builds 'em ROGERS Performance Sells 'em Toorenaar Trailers

EXPORT OFFICE: 50 CHURCH STREET
NEW YORK 7, N. Y., U. S. A. Cable Address: BROSITES

. . . for more details circle 345 on enclosed return postal card



Work in the most confined areas at less cost than old-fashioned tamping methods.

the Latest Development in
VIBRATORY SOIL COMPACTORS

Down South they wouldn't know what a CM-20 is, but ask about the Nervous Turtle and you get an earful . . . It's the only heavy-duty, one-man operated compactor on the market - develops a 6,600 lb. compaction wallop at speeds up to 75 feet a minute . . . Handles not only granular materials but many clay mixtures as well . . . Maneuvers close to abutments, retaining walls and piling; ideal for backfill jobs and shoulder work, railroad embankments, floors and foundations . . . The CM-20 penetrates up to 30 inches or more - in one or two passes, while its smaller version, the CM-15, will compact lifts up to 12 inches . . . Ask your local Terrapac distributor to demonstrate the model that is best suited to meet all of your varied job requirements. Call him today - you'll be ahead. 41-78

NO COMPARABLE MACHINES ON THE MARKET TODAY!

VIBRO-PLUS TERRAPAC

VIBRO-PLUS PRODUCTS, Inc.
STANHOPE, NEW JERSEY

WORLD'S LEADING MANUFACTURER OF VIBRATORY EQUIPMENT FOR OVER TWO DECADES.

. . . for more details circle 360 on enclosed return postal card

New Products

Ready-Mix Plant

A portable, high capacity transit-mix plant called the "Gopher" has been announced by the C. S. Johnson Co. The complete plant consists of a 40-ton capacity storage bin divided for three sizes of aggregate; a 6-yd. portable weigh batcher with 24-in wide discharge belt bolted to hopper frame; and a 285-bbl. capacity "Porto-Silo" with 4,000-lb. capacity cement batcher.

The aggregate batcher and discharge belt form an integral unit which includes wheels, axles, and pneumatic tires as standard equipment. Wheels and axles on the Porto-Silo are optional extras.

C. S. Johnson Company, Subsidiary of Koehring Company, P.O. Box 71, Champaign, Ill.

For more details circle 109 on Enclosed Return Postal Card.

Sign Maintenance

A new method to speed and simplify the repainting of aluminum street and highway signs has been announced by Magnus Chemical Co., Inc. The method calls for degreasing signs in the manufacturer's "Tuluol" or "Xylol" compounds, wiping, and then loading a shop rack with as many signs as possible for spraying at one time with a primer; Magnus P-302. The primer is said to offer unusual adhesion properties to both aluminum and old paint sub-surface and to new paint or reflection tape applications made over it.

Information on application, actual tests and product specifications are available upon written request.

Magnus Chemical Co., Dept. M-10, South Ave., Garwood, N. J.

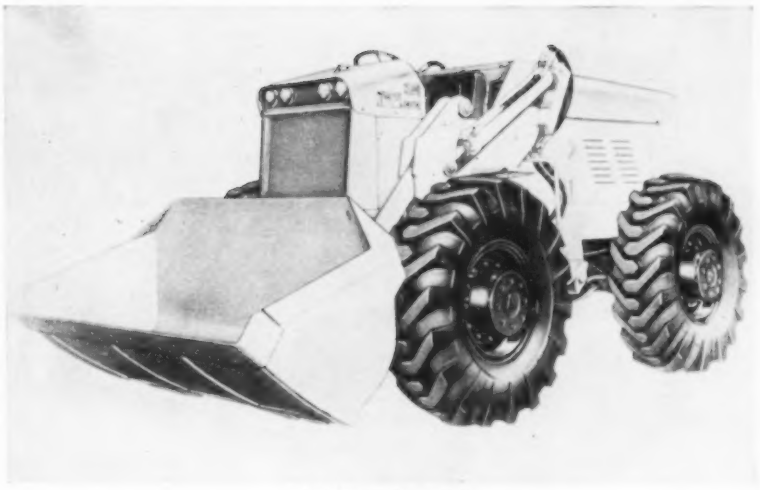
For more details circle 110 on Enclosed Return Postal Card.

Snow Plow Wearing Parts

A new line of roll-forged snow plow wearing parts and blades has been announced by Bucyrus Blades, Inc. This new "ForgeTemp" line has been designed with uniformly high resistance to impact and abrasion wear throughout the cross-section of the wearing part or blade. Included in the new line are shoes, nose pieces, wear plates, adapter brackets plow and wing blades for every make and model of snow plow equipment.

Bucyrus Blades, Inc., Bucyrus, Ohio

For more details circle 111 on Enclosed Return Postal Card.



A-C "Tractoloader"

Front End Loader

A new front end wheel loader, the Model TL-20 "TractoLoader", announced by Allis-Chalmers, incorporates an exclusive single-lever speed and direction control for more rapid operation. The operator can choose any of six speed and direction combinations through one lever.

The unit features an automatic clutch cut-off, and a touch of the brakes delivers full engine power to the hydraulic system. The 23,150-lb. unit has a carry capacity of 9,000 lbs. and is powered by a 130 hp Allis Chalmers diesel engine. Six buckets are available in sizes ranging from 2½ to 5 cu. yd. Selection of bucket size depends upon weight of material to be carried in pounds per cubic yard.

Allis Chalmers Mfg. Co., Deerfield, Illinois

For more details circle 112 on Enclosed Return Postal Card.

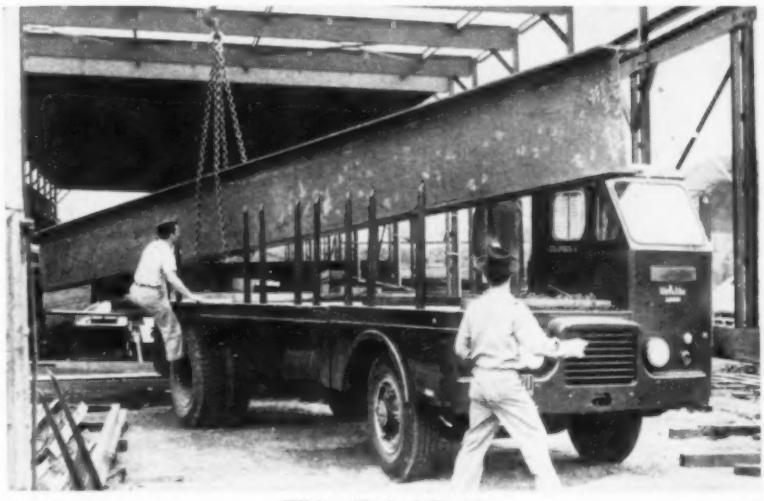
Oversize Deck Truck

A truck featuring an oversized deck, with cab space only 5.6 percent of overall area, is announced by The White Motor Co. Truck shown has 28½-ft. long deck gained through extension of deck along side of one-man cab. Truck has more than 195 sq. ft. of flat bed deck on a 163½ in. wheel base.

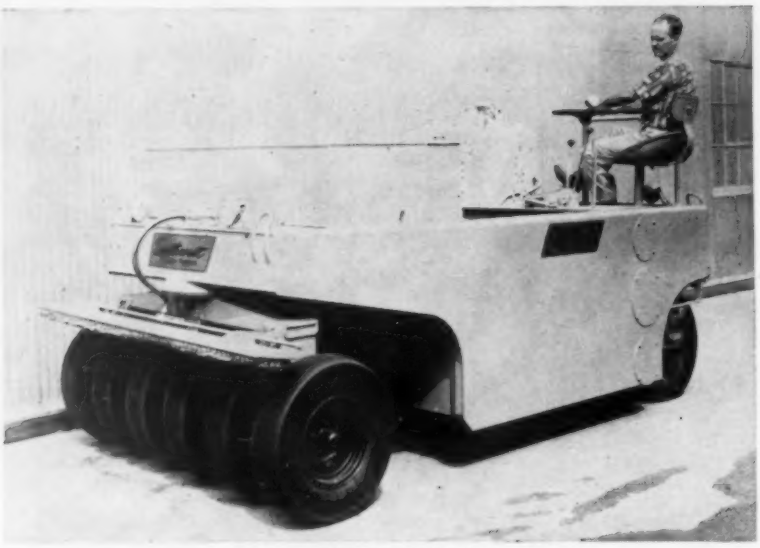
Deck is 1½ in. thick oak and can be loaded from all sides. The cab is protected by steel retaining walls. The unit, known as model 3022 "Util-I-Deck", has a five-speed transmission and single reduction rear axle. It is also designed with tandem rear axle for specific applications of long, bulky loads. Rating is 28,000 lb.

The White Motor Company, 842 E. 79th St., Cleveland 1, Ohio

For more details circle 113 on Enclosed Return Postal Card.



White Flatbed Truck



Southwest Roller

Pneumatic Roller

An improved version of the self-propelled roller "Model VP-11" has been announced by Southwest Welding & Manufacturing Division, Yuba Consolidated Industries, Inc.

The new unit also features vertically oscillating rear wheels designed to provide uniform compaction on uneven surfaces and 84 in. rolling width. Water tank capacity has been increased to 100 gallons, providing up to 15-20 percent more rolling capacity, it is said. Dished-type fifth wheel gives stability and strength in the front bolster and single lever control and full swiveling seat allows simple operation, manufacturer states.

Yuba Consolidated Industries, Inc., 351 California St., San Francisco 4, Calif.

For more details circle 114 on Enclosed Return Postal Card.

Cab Air Washer

The development of a new concept for greater operator comfort and efficiency at all temperatures, the Crenlo "Dust-Temp Air Washer" is announced by Crenlo, Inc. The Dust-Temp is designed to fit Caterpillar crawler tractors and motor graders and can be quickly installed in all current cabs, and many non-current units.

Along with dust control, the unit is an effective evaporative air cooler, maintaining comfortable temperatures within the cab even at high summer temperatures, the manufacturer states. With the optional heater attachment, it functions as a cab heater providing dust-free warm air with adequate capacity for low temperature operations. Complete defrosting af all glass surfaces is maintained even at sub-zero conditions. Unit operates without special attachments on tractors without an electrical system; water circulating pump and pressure fan are direct engine driven.

Crenlo, Inc., River Rd., Rochester, Minn.

For more details circle 115 on Enclosed Return Postal Card.

Truck Advancements

Advances in handling and durability, including a new suspension system, are announced by Chevrolet for their line of 1960 heavy duty trucks. The suspension design is of the independent front wheel type with ball joint and torsion rod springs on all but two series.

Most ½ and ¾ ton models feature coil spring rear suspension. Variable rate two-stage leaf spring suspensions are new on two-ton and larger models.

Redesigning theme has created functional lines; all sheet metal is integrated with new chasis design for rigid, low, accessible cab and sturdier front end assembly. Four basic motors and 12 transmissions are available in the 1960 line.

Chevrolet Motor Division, General Motors Corporation, General Motors Bldg., Detroit 2, Mich.

For more details circle 116 on Enclosed Return Postal Card.

Joint Matcher

An automatic joint matching attachment that controls longitudinal screed level during bituminous paving is available for use with Blaw-Knox Company's "Express" paver and the Model PF-90 bituminous paver finisher. Once the exclusive joint matching attachment is adjusted to an adjacent compacted surface at the joint line, it maintains accurate paving depth control at the screed without manual adjustment, the maker states.

The unit is said to anticipate surface irregularities ahead of material placement. This automatic screed depth adjustment, which eliminates human error, controls transverse contour at the joint line before the screed reaches a point of variation.

Designed for easy mounting and adjustment, the new Blaw-Knox joint matching attachment can be positioned on either side of one of the firm's two large bituminous paving units, and can be easily changed from one side to another in the field. Extensions are available to match screed widths up to 16 feet.

In addition to matching elevation of joints in multiple lane bituminous paving operations, the joint attachment can be used to control elevation of base and finish courses with respect to most curbs and gutters.

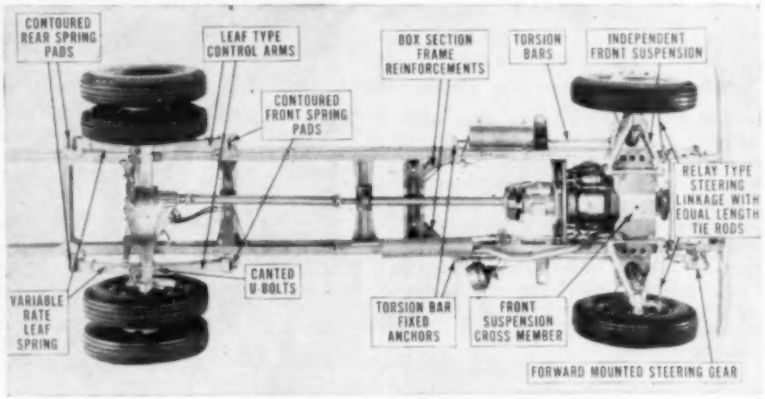
Blaw-Knox Company, 300 Sixth Avenue, Pittsburgh, Pa.

For more details circle 117 on Enclosed Return Postal Card.

Portable Space Heater

Stow Mfg. Co. has put on the market a new portable space heater burning

(Continued on page 139)


CONTOURED REAR SPRING PADS
LEAF TYPE CONTROL ARMS
BOX SECTION FRAME REINFORCEMENTS
TORSION BARS
INDEPENDENT FRONT SUSPENSION
CONTOURED FRONT SPRING PADS
RELAY TYPE STEERING LINKAGE WITH EQUAL LENGTH TIE RODS
CANTED U-BOLTS
VARIABLE RATE LEAF SPRING
TORSION BAR FIXED ANCHORS
FRONT SUSPENSION CROSS MEMBER
FORWARD MOUNTED STEERING GEAR

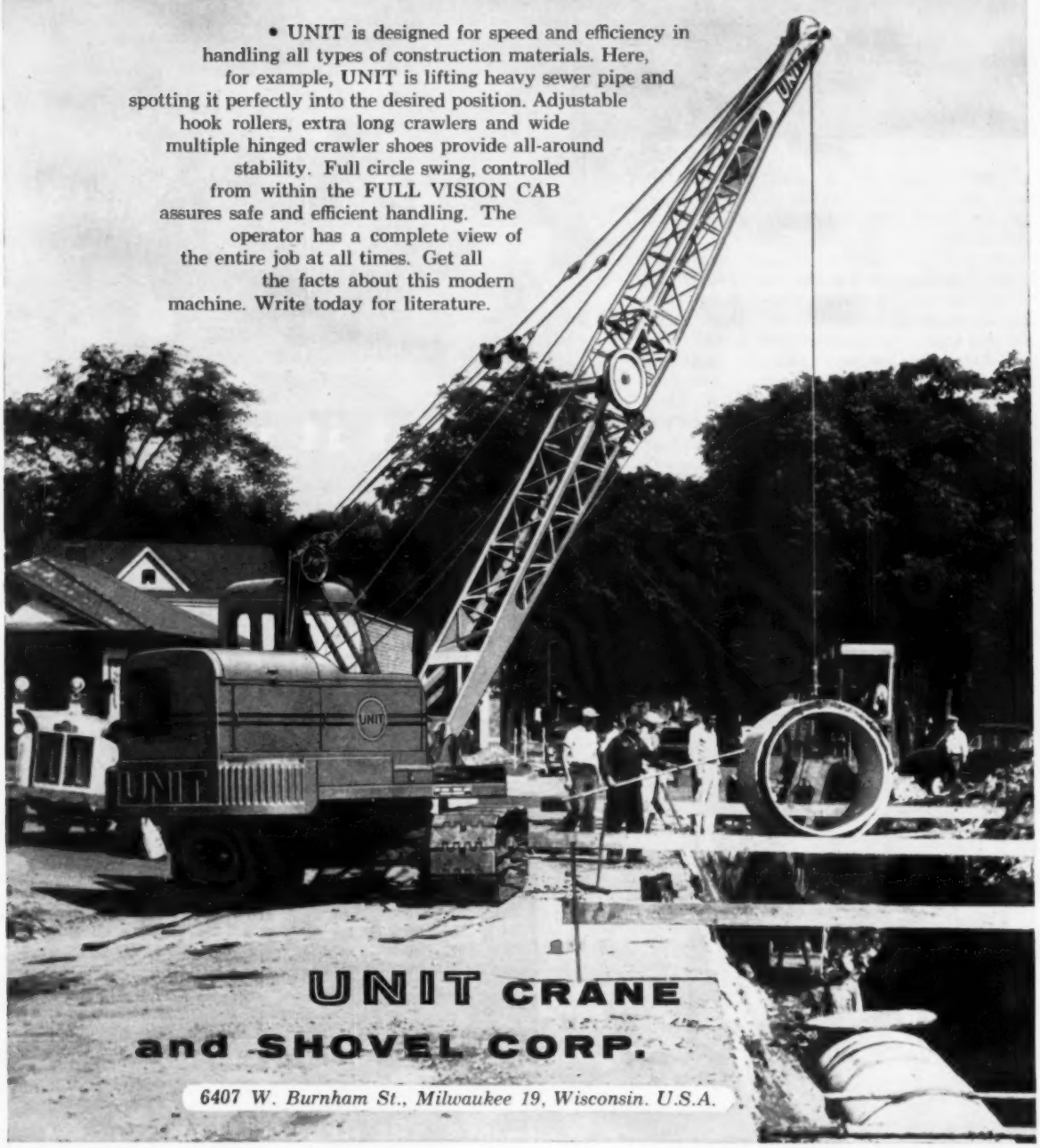
1960 Chevy Truck Chassis

UNIT CRANE & SHOVEL CORP. MILWAUKEE, WISCONSIN

fast Handling

with SAFETY!

• UNIT is designed for speed and efficiency in handling all types of construction materials. Here, for example, UNIT is lifting heavy sewer pipe and spotting it perfectly into the desired position. Adjustable hook rollers, extra long crawlers and wide multiple hinged crawler shoes provide all-around stability. Full circle swing, controlled from within the FULL VISION CAB assures safe and efficient handling. The operator has a complete view of the entire job at all times. Get all the facts about this modern machine. Write today for literature.



UNIT CRANE and SHOVEL CORP.

6407 W. Burnham St., Milwaukee 19, Wisconsin. U.S.A.

. . . for more details circle 359 on enclosed return postal card

NEW-

Tow it into place

...Weir Contracting Co. tows their Heltzel Unitized, Mobilized Batching plant from previous job site on its own transportation wheels...

Heltzel's new 100 and 150-ton, pushbutton batching plants are now *unitized* and *mobilized* for easier moving—for faster setup—for greater savings of time and money.

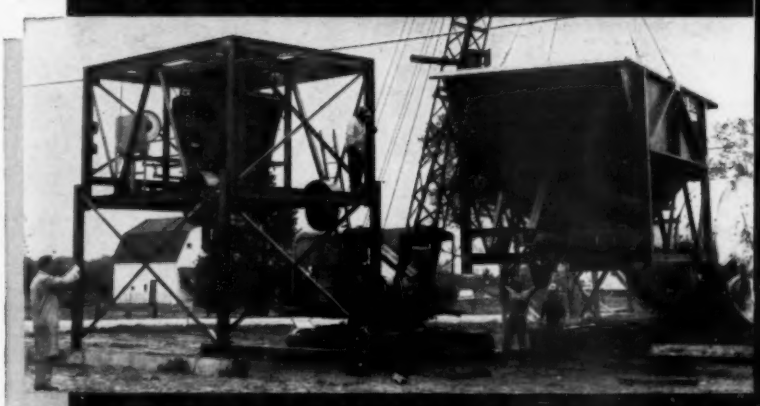
The new plant consists of two self-contained mobile sections; hopper section and batcher section (including scales) with new fold-up supporting columns. Both sections have built-in wheel assemblies and towing tongues—ready to roll.

Weir Contracting Company of Detroit, Michigan reports: "... Our first job was in Greenbrier Meadows Subdivision, Livonia, Michigan. After the plant arrived on the site it was ready for operation in a very few hours. We found that the speed of batching will give two complete batches in thirteen seconds. On subsequent work, the plant was dismantled and ready for transportation in two hours and towed by small, single axle dump trucks to the new location. We have found that the built-in transportation wheels save us over $100.00 a move because of not having to rent trailers."

For complete data and specifications contact your nearby Heltzel representative—or write us direct.

Set it up fast

... batcher section is raised into position, hinged columns are lowered and bolted in place ...



... bin section is positioned and bolted on top of batcher section.

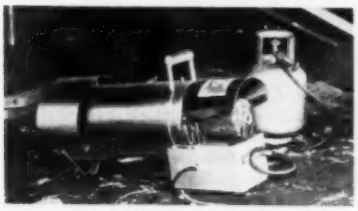
Start batching

In just a few hours this full size, high capacity, pushbutton paving plant is ready to operate!

THE HELTZEL STEEL FORM AND IRON COMPANY
WARREN, OHIO

New Products

(Continued from page 136)



Stow LPG Space Heater

liquid petroleum gas and designed specifically for the construction industry. Because of its portability, it can be moved around the job to warm workers, thaw out machinery, cure concrete, dry plaster, mortar, and other materials.

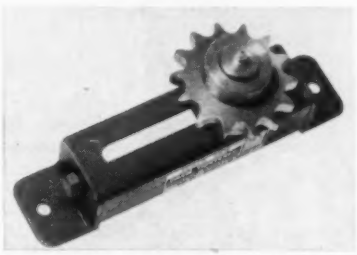
The Stow model LPG200 heater, weighing 45 lb., is radiant, and recirculating, and engineered for quiet, sootless production of high volume heat—200,000 BTU's. A 1/8 hp motor drives a fan that circulates the warm air at a rate of 2,000 cu. ft. per minute. The standard model includes a burner control that quickly turns off the fuel should the power fail or the flow of gas be interrupted.

Stow Mfg. Co., 65 Shear St., Binghamton, New York

For more details circle 118 on Enclosed Return Postal Card.

Chain Tightener

To aid in the reduction of maintenance costs on chain saws, a streamlined, S-S screw adjusted chain tightener is available from Industrial Marketers. The device comes in three stock



Industrial Marketers Chain Tightener

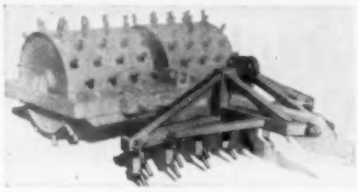
sizes to fit any standard chain and will reduce vibration, provide ample take-up and extend chain life, the manufacturer states.

Industrial Marketers, Box 28 Ferndale 20, Mich.

For more details circle 119 on Enclosed Return Postal Card.

Manipulator Bar

A manipulator bar for use with sheepsfoot rollers has been designed and offered nationally by the McCoy Company of Denver. The bar, for use on all earth fill jobs, provides uniform mixing of materials and moisture at controlled depths for best compaction; helps eliminate soft spots and voids; rips into previously compacted earth to provide a bonding with the new



McCoy Manipulator Bar

layer and facilitate a firm fill from bottom to top, according to the manufacturer. The bar is designed to ride the sheepsfoot drawbar and is removed by withdrawing the draft bolt. It is operated by any standard rear cable control unit, has five depth adjustments to a maximum of 15 in. penetration. Unit weights approximately 1¼ tons.

McCoy Co., 6000 Colorado Blvd., Denver 17, Colo.

For more details circle 120 on Enclosed Return Postal Card.

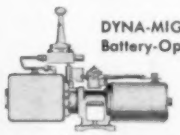
COAST TO COAST

MONARCH

POWER HYDRAULIC CONTROLS

lift and lower snow plows automatically!

Snow removal is easier, faster, more economical. See your dealer or write for illustrated folder.



DYNA-MIGHT Battery-Operated

HY-LO-JACK

HY-LO-JEEP Fan-Belt Driven

MONARCH ROAD MACHINERY COMPANY

1331 Michigan St., N. E.
Grand Rapids 3, Michigan

. . . for more details circle 335 on enclosed return postal card

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By E. J. YODER, Purdue University

Offers both principles and design methods for flexible and rigid pavements. The author clarifies many of the practices that have been adopted to met specific loading and environmental conditions. Methods of evaluating pavement performance and types of failure are also thoroughly covered.

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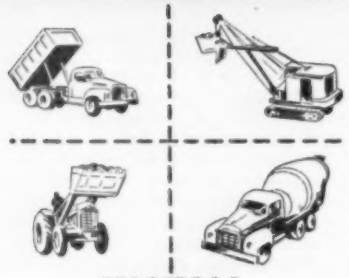

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THE SERVICE RECORDER COMPANY

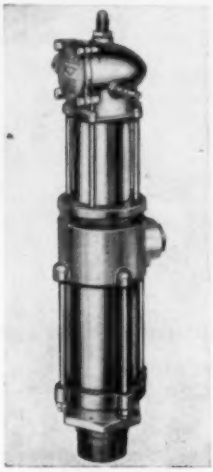
1013Z ROCKWELL AVE., CLEVELAND 14, OHIO

. . . for more details circle 346 on enclosed return postal card

Fluid Dispensing Pump

A new air-motor operated, fluid dispensing pump for heavy construction contractors has been introduced by Lincoln Engineering Company, manufacturers of lubricating equipment and accessories.

Manufacturer states this high volume, one to one ratio, double-acting pump delivers 2/3 pint per cycle, or 10 to 12 gpm with 50 psi of air pressure. It is



Lincoln Dispensing Pump

designed to dispense fluids such as gasoline, diesel oil and water. The unit provides dependable service regardless of extreme temperatures, moisture, dust or normal abuse, the manufacturer states. Dimensions are: 21¼ in. high, 57 in. wide. Fluid outlet is 1 in. NPTF.

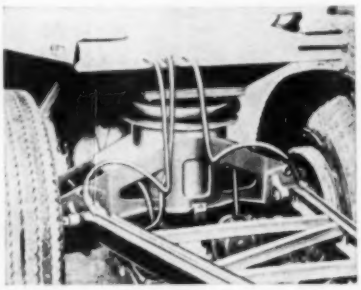
Lincoln Engineering Co., 4010 Goodfellow Ave., St. Louis 20, Mo.

For more details circle 121 on Enclosed Return Postal Card.

Fifth Wheel Suspensions

Western Unit Corporation, specializing in the engineering and manufacture of components for trucks and trailers, is now manufacturing and distributing Smithway Fifth Wheel trailer suspensions.

The units are light, strong, front suspensions for 2-axle pull trailers and are made in two models. The Model 300 axle-mounted 5th wheel, for use on any axle, is suitable for hoppers, flatbeds, transfer trailers and any trailer where a higher mounting can be used. The Model 200 integral axle is a complete front suspension and is particularly suited for use where low mount is desired.



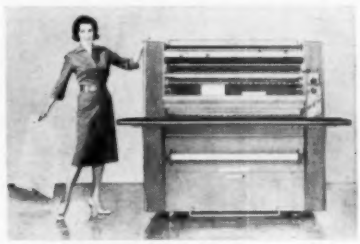
Smithway 5th Wheel Suspensions

Western Unit Corporation, 17747 East Railroad Street, City of Industry, California

For more details circle 122 on Enclosed Return Postal Card.

New Whiteprinter

A medium-volume whiteprinter has been introduced by the Charles Bruning Company, Inc. Among the distinguishing features of the model 435 are its 42-in. printing width, 3,000 watt lamp, and mechanical speed ranging up to forty feet per minute. Other conveniences include a new air-jet separator which automatically separates tracings from prints after exposure,



Bruning Whiteprinter

and a foot treadle for releasing incorrectly fed stock. The unit is fabricated from heavy gauge metal, welded and reinforced for additional strength. Its compact design and two-tone gray finish makes it attractive as well as functional. The pressure-roller developer system assures positive print development at all speeds and on all types of materials the manufacturer states.

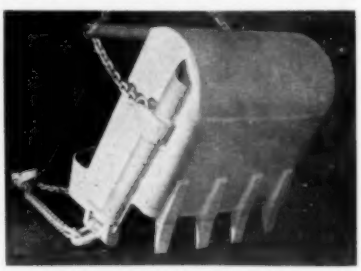
Charles Bruning Company, Inc., Mt. Prospect, Ill.

For more details circle 123 on Enclosed Return Postal Card.

Light Duty Dragline

A new line of dragline buckets for light and general purpose work, including levee and swamp work, ditching and sand and gravel operations, is offered by the Williams Bucket Division, The Wellman Engineering Co.

Lip, bottom scoop plate and skid runners have been replaced by a heavy one piece bottom resulting in smooth interior and exterior surfaces for fast digging and dumping, the maker states.



Williams Bucket Dragline

Set up to 200 Seedlings a Day By Yourself with a

Known as Williams type "DC" draglines, the new models are available in ⅝ cu. yd. through 1 cu. yd. capacities, with or without perforations.

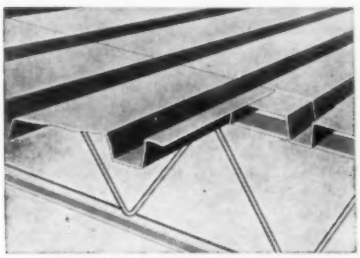
The Wellman Engineering Co., 113 St. Clair Ave., N.E., Cleveland 14, Ohio

For more details circle 124 on Enclosed Return Postal Card.

Lightweight Roofing

The Lightweight "Ferrobord" steel roof decking in 24 in. widths, is announced by Republic Steel's Truscon Division.

Roll formed from 18, 20 and 22-ga. cold rolled steel strip, copper-bearing steels or tight coated galvanized steel, the roof deck comes in units 1½ in. in depth and up to 32 ft., 6 in. in length.



Republic Steel's Ferrobord

Straight lay is used, enabling several crews to lay deck simultaneously.

Ease and speed of erection are said to be further aided since the 24 in. decking is electric arc welded directly to the steel purlines. Adjacent sheets are joined by interlocking and securely fastened by means of button punching to assure maximum transfer of loads.

Truscon Division, Republic Steel Corp., Youngstown, Ohio

For more details circle 125 on Enclosed Return Postal Card.

Centrifugal Pump

"High'r Pow'r" self-priming centrifugal "Flomax" pumps of the utility type take their name from the use of an engine of greater power output than is normally used for this size 3 in. pump. This series of pumps was designed expressly for pumping water and other fluids of similar viscosity at high altitudes, or for pumping fluids of higher specific gravity at lower elevations.

The other characteristics of this unit are; 15,900 gph and pressures up to 40 psi; self priming, high capacity at high heads; and straight crankshaft-to-pump connection. The latter employs a standard straight keyed crankshaft instead of a special tapered, threaded shaft. This permits quick change of engines in the field or the rapid change-over of an iron to a bronze pump, the manufacturer states.

Marine "Flomax" Pump

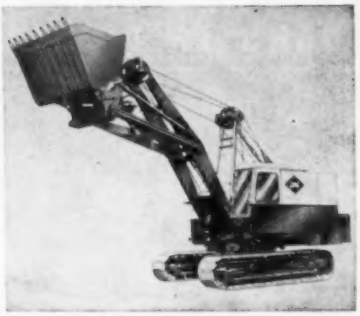
Marine Products Company, 574 Lycaste Ave., Detroit 14, Michigan

For more details circle 126 on Enclosed Return Postal Card.

Five-Yard Loader

A 6-cu. yd. loader that does its own digging and converts quickly into a shovel, crane, dragline or pullshovel has been introduced by the Lima Works Construction Equipment division of Baldwin-Lima-Hamilton Corporation. Main features of the new machine are a long 9 ft. 10 in. horizontal movement of the bucket and a 360-deg. swing. These advantages permit the bucket to dig into an embankment or stockpile, fill completely, and swing to any point of the compass for dumping, all without moving the crawler chassis.

By practically eliminating the need to maneuver the entire machine during digging and loading operations, the Lima Loader speeds loading of materials into trucks, reduces travel wear and lowers fuel consumption, according to the manufacturer.



Lima Loader

Baldwin-Lima-Hamilton Corp., Lima, Ohio

For more details circle 127 on Enclosed Return Postal Card.

Portable Space Heater

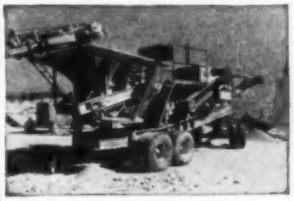
The 1959-60 version of the "Champ-Heater" produced by Champion Heater Company, operates on a principle said to be entirely new to the space heater field—the same principle as is used in residential type oil burners. It has two entirely separate sources of air, one to support combustion, the second (on top of the heater) for heated air circulation.

A built-in thermostat is standard equipment on Champ-Heater Model

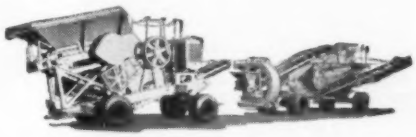
Since 1885—"BEST BY EVERY TEST"

TOOLS to produce aggregates for primary and secondary road work

JOB SITE PORTABILITY with ruggedness, economical operation and high production where and when you want it. For aggregate stock piling and truck delivery.



PORTABLE SINGLE PASS IMPACT HAMMERMILL UNIT for crushing lime stone and medium hard rock. For peak production and economy. Up to 300 tons hourly.



PORTABLE PRIMARY CRUSHING UNIT and PORTABLE SECONDARY SCREENING, CONVEYING and MATERIAL HANDLING UNIT. Primary Unit for coarse power shovel feed, conveys to Secondary Unit or to trucks. Secondary Unit produces specification size aggregates and conveys to trucks or to stock piles.

PORTABLE SAND and GRAVEL SCREENING and WASHING UNIT in three sizes: 25 tons to 75 tons hourly with scrubber screens, sand jacket, sand dehydrator and three loading-delivery conveyors.

PORTABLE SINGLE PASS ROCK and GRAVEL JAW CRUSHING UNIT. Choice of 5 sizes of crushers. 40 tons to 125 tons hourly crushing oversize rock and for severing 2 or 3 different sizes for blending together and for delivery to stock piles. Ideal for windrow service.

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GRUENDLER CRUSHER & PULVERIZER CO.

Dept. R.S.-1059 **2915 N. Market St., St. Louis 6, Mo.**

. . . for more details circle 364 on enclosed return postal card

Set up to 200 Seedlings a Day By Yourself with a DANUSER DIGGER

Precision Engineered to Last a Lifetime!

DIG HOLES SITTING DOWN! Your DANUSER DIGGER can pay for itself in saved time and labor because it makes hard jobs easy, requires little maintenance, and lasts a lifetime. It is precision engineered, from the best materials, to stand the strain of moving big amounts of earth. That means it is perfect for heavy jobs like setting seedlings. The 24" auger illustrated is too big for less rugged diggers, yet the DANUSER DIGGER handles it easily. Other auger sizes, from 4" to 18", available for fencing, foundations, many other uses. Write today for literature describing application to your tractor.

DANUSER MACHINE CO.

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"Contributing to Farm Mechanization"

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. . . for more details circle 354 on enclosed return postal card

Champion Portable Space Heater

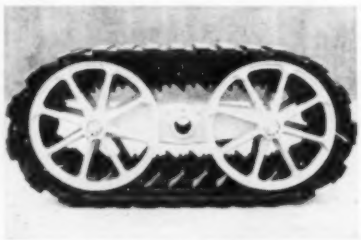
120-T. This thermostat, which turns the unit off at a predetermined temperature, also serves as a high heat limit safety switch that prevents the unit from overheating, the manufacturer states. Styled in a new low silhouette, the Champ-Heater operates on regular 110-115 volt, 60 cycle AC, and uses kerosene or number 1 fuel oil. It comes in three sizes.

Champion Heater Company, 3700 Forest Park, St. Louis 8, Missouri

For more details circle 128 on Enclosed Return Postal Card.

Crawler Tracks

A new design in crawler tracks for industrial equipment is announced by M. J. Crose Manufacturing Company, Inc. The new Crose Model TW-10 "Trac-Wheel" is of simplified design which incorporates such features as greater track bridge strength, wear resistance and a central lube system for axle and spindle.



Crose Crawler Tracks

The track is said to have both functional and economic advantages which are now being offered to all manufacturers of equipment which utilize crawler wheels, and to users of such equipment as a replacement item.

Industrial Sales Division, M. J. Crose Manufacturing Co., Inc., P.O. Box 3368, Tulsa, Oklahoma

For more details circle 129 on Enclosed Return Postal Card.

Trailer Dump Body

An extra-long dump trailer package that affords haulers the security of a full frame trailer, yet substantially reduces deadweight to enable users to meet bridge laws imposed by individual states is now available from Hercules Steel Products Company. The 28-ft. steel bodies are mounted on a

Hercules Dump Body

31-ft. chassis to obtain a maximum legal payload of 43,000 lb. The new dump trailer bodies are of corrugated steel construction to minimize weight and maintain structural strength and are also available in aluminum models for even greater weight savings, the company states.

Hercules Steel Products Company, Galion, Ohio

For more details circle 130 on Enclosed Return Postal Card.

Pedestal Crane

A new pedestal-mounted electric crane from R. G. LeTourneau, Inc. is suitable for a wide range of industrial applications and can pinpoint load positioning to within .008 of an inch or less, the manufacturer states. The unit has a minimum capacity of 6 tons and is said to be especially well adapted for installation where precision loading is necessary.

Work functions of hoisting, luffing and swinging are each powered by individual a.c. electric gearmotors, operated separately or simultaneously from a small remote control box which permits the operator to choose any vantage point. The precision of the load-handling is largely due to electro-magnetically controlled spring-loaded disc brakes which are incorporated in each gearmotor. The brakes release when the

LeTourneau 6-Ton Crane

motor control switch is pressed, and engage when the switch is released.

Maximum safety is provided by powered down-travel with "no-wear" braking which prevents overspeeding even with full 6-ton loads. Also, should electrical power failure occur, the gear-motor disc brakes set instantly to stop operation and prevent "free falls."

R. G. LeTourneau, Inc., 2399 South MacArthur, Longview, Texas

For more details circle 131 on Enclosed Return Postal Card.

Measuring Wheel

A precision-calibrated instrument for outdoor measuring over all types of terrain is announced by Rolatape, Inc. The new wheel features one man operation and registers measurements from ½ in. on one side of the disc wheel and tenths of a foot on the other.

Rolatape Measuring Wheel

New model 415 equipped with an automatic brake, has a wide neoprene tire that is said to give maximum traction under varying conditions. The unit can measure almost 19 miles and can be operated efficiently from a slow moving car, the maker states.

Rolatape Inc., 1741 14th St., Santa Monica, Calif.

For more details circle 132 on Enclosed Return Postal Card.

Spline Drive Armatures

A new line of spline drive armatures for use on integral horsepower electric clutch-coupling and brake applications is announced by Warner Electric Brake & Clutch Company. These armatures are expressly produced for applications where shock-loading or vibration-loading are problems.

Armature assemblies are available in 8, 10, 12 and 15-in. diameters. No mounting adjustment is required and initial lubrication is all that is necessary, the maker states. Automatic compensation for magnet and armature wear is provided by the auto-gap spring.

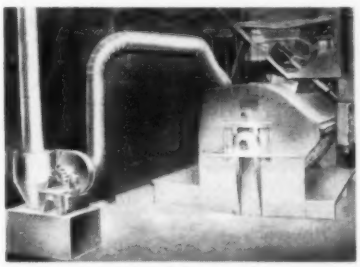
Warner Electric Brake & Clutch Company, Beloit, Wis.

For more details circle 133 on Enclosed Return Postal Card.

Warner Spline Drive Armatures

Dust Control Unit

The dust problem created when a batch weigher dumps its load into the mixer has been attacked by the "Dustkop" a product of the Aget Manufacturing Co. As the batcher moves into dumping position it trips a switch which starts the "Dustkop". The unit then sucks air into the mixer through joints and cracks and creates a negative



Aget "Dustkop"

pressure within which prevents batching dust from escaping, the manufacturer states. The dust, held inside the mixer is then carried through the exhaust pipe to the separator. Here dust and air are separated—the dust exhausted into a storage bin, the clean air into the outside building vent.

The Aget Manufacturing Co., Adrian, Michigan

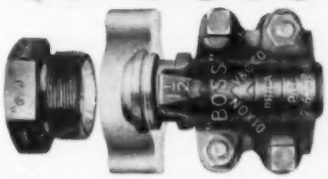
For more details circle 134 on Enclosed Return Postal Card.

Headache Ball

Two new models in the "Swiveling Headache Ball" series have been added by Miller Swivel Products, Inc. This addition enables the company to furnish

Miller Swivel Headache Ball

"GJ-BOSS"



GROUND-JOINT FEMALE COUPLING, STYLE X-34

SO *Reliable* FOR PILE DRIVING

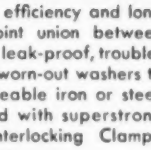
...AND ANY STEAM, AIR, WATER AND HYDRAULIC SERVICES...

HIGH OR LOW PRESSURE

Washerless

Unequalled for safety, efficiency and long service life. Ground-joint union between stem and spud provides leak-proof, trouble-free seal . . . no lost or worn-out washers to replace. All parts malleable iron or steel, rustproofed. Furnished with superstrong "Boss" Offset and Interlocking Clamps. Sizes ¼" to 6", inclusive.

COMPANION MALE COUPLING "BOSS" STYLE MX-16



Companion coupling for "GJ-Boss", described above, and "Boss" Washer Type Couplings Style W-16. Each size fits same size hose . . . oversize hose not required. Furnished with "Boss" Offset and Interlocking Clamp. Sizes ¼" to 6", inclusive.

"BOSS" HOSE MENDER, STYLE BM-16

The practical, safe way to restore damaged hose to service. Fitting consists of corrugated mender tube and two "Boss" Interlocking Clamps. Tube has flanges to engage clamp fingers. Thoroughly rustproofed. Sizes ½" to 6"

Stocked by Manufacturers and Distributors of Industrial Rubber Products

DIXON
Valve & Coupling Co.
GENERAL OFFICES & FACTORY—PHILADELPHIA 22, PA.
BRANCHES—CHICAGO · BIRMINGHAM · LOS ANGELES · HOUSTON
DIXON VALVE & COUPLING CO., LTD., TORONTO. Associate Companies:

. . . for more details circle 303 on enclosed return postal card

a swiveling overhauling ball or any length boom or capacity crane, the manufacturer states. Model HB8 is a 100-lb., 8 in. diameter ball with a 5 ton capacity and Model HB12 is a 265-lb. 12 in. diameter ball with an 8.5 ton capacity. Both models are available in the standard four types for easy rigging: clevis, eye, wedge, and thimble.

Miller Swivel Products, Inc., Pomona, Calif.

For more details circle 135 on Enclosed Return Postal Card.

Sand Screening Plant

A new sand screening plant that is completely self-contained and mobile is announced by Eastern Engineering Company. The unit, known as "Porto-Screen", comes in two

EESCO Sand Screening Plant

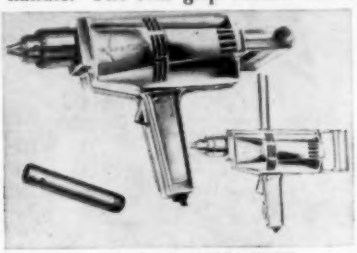
models. A small hopper can be incorporated in the screening plant for the purpose of adding bagged salt with sand for ice sand.

Eastern Engineering Sales Company, 25 W. Howard St., Qunicy, Mass.

For more details circle 136 on Enclosed Return Postal Card.

½ in. Portable Drill

A new reversible ½ in. portable electric drill, the Speedway No. 40R, and a twin ½ in. drill without the reversible feature, No. 40, have been introduced by SpeedWay Division, Thor Power Tool Company. Both drills have 6.5 amp. power rating and handling ease is provided by means of a two-position rear handle, removable top handle, and pistol type main handle. The rear grip handle on both models



Speedway Portable Drill

revolves to vertical or horizontal position and fastens securely in either position. Both handles can be removed completely for working in close quarters. Also, both models feature push-button lock for continuous operation. Overall length of either drill with the rear handle is 14⅜ in. without the rear handle 11¼ in.

Speedway Division, Thor Power Tool Co., 1421 Barnsdale Rd., La Grange Park, Ill.

For more details circle 137 on Enclosed Return Postal Card.

Portable Batch Plant

A 300-ton portable batching plant has been introduced by The Fairfield Engineering Co. "Fairbatch" plant is offered in aggregate or combined aggregate and cement type with various arrangements from 2 to 8 compartments.

Low cost unitized erection makes the 300-ton plan desirable for concrete products and ready mixed concrete operation. Smaller plants are available down to 100 tons.

Standard Products Division, The Fairfield Engineering Co., Marion, Ohio

For more details circle 138 on Enclosed Return Postal Card.

WAYS THAT AN INFERIOR SPRAY BAR CAN COST YOU MONEY.

Flushing the bar into a ditch—time and wasted material

Putting a torch on the spray bar—time wasted.

Cleaning nozzles and having to stop spray to unplug clogged nozzles.

Screwing blanks in—or removing them and replacing nozzles.

Flushing the bar with solvent except where light material is to be sprayed following the spraying of Asphalt Cement etc.—wasted solvent.

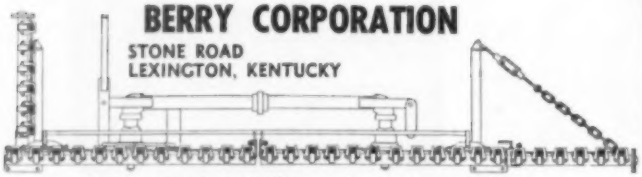
Handspraying an area prior to takeoff due to nozzles not all firing instantly. (Nozzles that do come on, flood part of the area which can make it slippery and require extra chips.) Hand spray is not accurate. This operation wastes considerable of the operator's time. Also the time of the dump truck drivers.

Damage done to the spray bar as a result of ends striking a post or guard rail etc., which may shut down the job until repairs can be installed. Stripped threads in nozzle holes etc.

Uneven distribution across the bar resulting in cover stone retained in streaks, or stripped off.

ELIMINATING ALL OF THESE *UNNECESSARY COSTS* BY THE USE OF THE *ALL NEW* CARTWRIGHT PRECISION HOT SPRAY BAR IS A WORTH WHILE INVESTMENT. Write for bulletin describing this new spray bar to;

BERRY CORPORATION
STONE ROAD
LEXINGTON, KENTUCKY



. . . for more details circle 302 on enclosed return postal card

NOW YOU CAN PATCH, REPAIR OR RESURFACE RE-OPEN THAT HIGHWAY IN ONE HOUR

T-K PATCH—The bond that is stronger than concrete itself—

Ideal for OLD and NEW concrete road work:

- √ Reduces down time to absolute minimum
- √ Adheres to moist or wet surfaces
- √ High resistance to wear and impact
- √ Completely waterproof—outlives average concrete
- √ Unaffected by temperatures—salts, oils, greases, acids, alkalies and other chemicals
- √ Will not shrink or expand

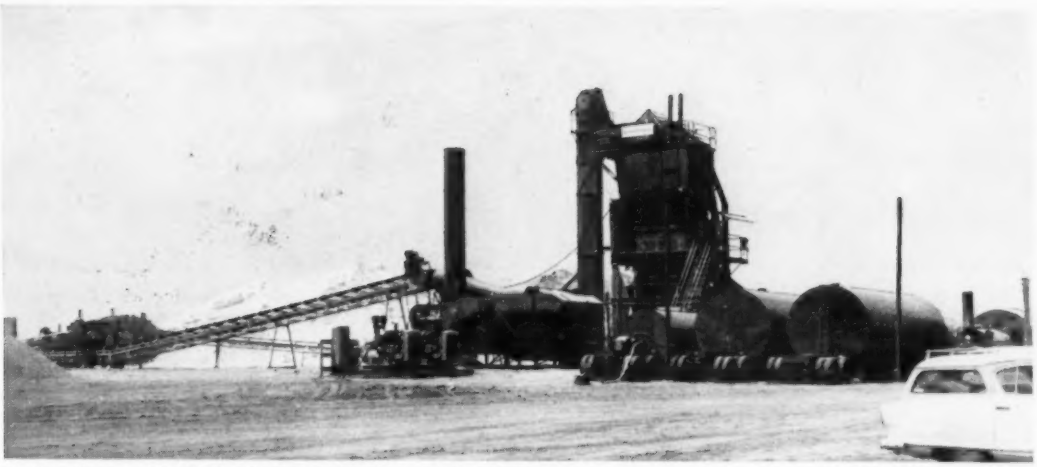
T-K PATCH contains epoxy resins that make it ideally suited to road application. Makes pot-hole, surface and crack repairing - fast - easy - permanent and low cost. It's easy to apply.

Get complete information on T-K PATCH now.
Also, DEALERSHIPS AVAILABLE IN CERTAIN AREAS—WRITE:

W. F. MACKLIN CO., INC.

Dept. R 336 Taft Street N.E. Minneapolis 13, Minnesota

. . . for more details circle 366 on enclosed return postal card



Barber-Greene BatchOmatic hot-mix plant produced 180 tons per hour and used an elaborate conveyor belt setup to handle the four aggregates. Plant used Hy-Way oil heater and Partlow thermometers.

High-Speed Flexible Bituminous "I" Project

Special Double-Length Project Report

By H. K. Glidden

Contributing Editor to Roads and Streets

Managers of the San Ore Construction Company of McPherson, Kansas, recognized that they were gambling when they submitted the low bid of $3,171,485 on three adjacent Interstate bituminous paving projects near Wakeeney, Kansas. On the other hand, they reduced the odds to reasonable portions by capitalizing on foresight extending back over a period of years.

Roy Mauser, general superintendent for San Ore, described the Kansas contract procedure something as follows: "The state sets up the required gradation. It then gives the bidders information on available sources of aggregate. It is up to the contractor's ingenuity to secure results by some combination of materials from any and all of the several sources. The state specifications also let the contractor use sources of his own if he so desires. The problem is to produce suitable aggregate and keep the haul to a minimum."

Mauser's comments on his supervisory help is typical of San Ore thinking. He said, "If one of my foremen isn't continually thinking at least a week ahead he is no good to me."

This is the story of how the contractor solved the aggregate location problem and then used $2 million worth of the latest equipment to complete a mile of Interstate highway every six days.

The plains of western Kansas are particularly deficient in either ledges where solid rock can be crushed or pits containing large gravel. Sand pits in Kansas are scattered widely. The information regarding the location, gradation, and characteristics of the aggregate in the state-located pits is made part of the special conditions of the contract. It is

● **Two dozers shovel sand into trap in the largest of several aggregate pits. Conveyor working with Cedarapids screening unit loaded 350 tons per hour into Omaha Standard and Insley bottom-dump bodies.**

Years of looking ahead put contractor in position to secure and successfully execute a 120-day contract for a 20-mile bituminous base and surfacing job in aggregate-scarce western Kansas.

The roadbed design as well as contractor methods is of considerable interest: Heavy road-mixed bituminous stabilized base and 4 inches of asphaltic concrete specified for this Interstate segment.

optional with the contractor whether or not he arranges with the owners to use the pits which the state has located. He may use other pits of his own choosing, should they meet the requirements. The accompanying table shows the requirements and control tests for this project.

San Ore's success in meeting the Kansas specifications can be credited largely to advance planning.

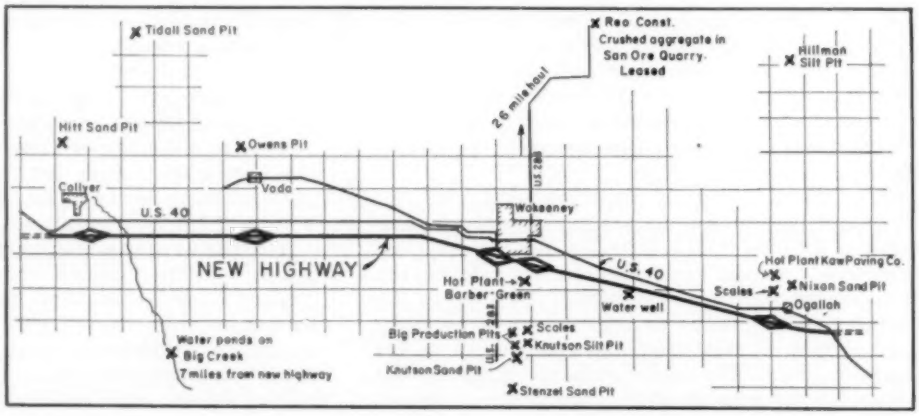
In discussing the aggregate situations, Mauser pointed out that San Ore, as long as five years ago, realized that sooner or later modern road projects would be wanted through this area. At that time the company located and obtained a long-term lease on about the only crushed-aggregate quarry. This quarry, 26 miles north of the project here described, is used to sweeten the mix by supplying the missing ⅜-in. aggregate.

As much as ten years ago, Mauser realized that most Kansas sands are deficient in the range passing the 80 to the 200-mesh screen. He located and leased a large sand pit near McPherson, all of which falls in the 80-minus classification. San Ore has used this pit continually, and has shipped this material to many other contractors.

Another example: the firm spent approximately $11,500, testing for aggregate pits before it bid on this project.

The net result is that the company imported its own fine sand from a distant source at McPherson, Kansas; crushed its own aggregate north of the project; and reduced the haul by using several sand pits which were not shown on the Kansas project plans. All of these factors put together have enabled San Ore to consistently produce aggregate which meets the exacting requirements of the Kansas specifications, and do so very economically.

● *Design.* The Kansas highway department, in the design of flexible pavements, faces a number of problems. First, there is the shortage of good aggregate. Secondly, there is a big temperature change; summer-



Material sources and plant set-ups for San Ore construction's 20-mile project—a key to the low bid, since material transport was the biggest controllable job variable.

New Model PS-70 Portable Screening Plant is available in sizes for every screening requirement. Write for literature.

High capacities . . . the ultimate in portability

NEW BARBER-GREENE SCREENING PLANT

Here's the all-new Barber-Greene Model PS-70 Portable Screening Plant, which gives high capacities and the ultimate in portability at lowest cost. It is the ideal means of producing sized aggregates for all types of construction work. Because the plant screens while it loads, it allows the two operations to be performed simultaneously, thus effecting a considerable saving in both time and expense.

The plant offers many advantages which increase production and cut costs:

Capacity for every requirement. Wide choice of belt widths and screen sizes allows selection of the proper size plant for every screening requirement.

The ultimate in portability. Entire plant, including hopper or trap, is readily towed from job to job without disassembly. Screen is merely folded under conveyor for travel. Large, single pneumatic tires; rugged axle and truck, and convenient towing hitch allow high-speed towing.

New, highly efficient screen. Designed and built exclusively for screening plant service, the screen offers exclusive Vibra-Spring suspension, which decreases resistance to vibration, increases spring life and assures top screening capacities. Push-arms extending from conveyor support screen and make ground supports unnecessary.

Rugged portable conveyor. The portable conveyor has all the features of ruggedness, dependability, portability and high capacity for which Barber-Greene Portables are famous.

Plus — simple boom hoist with positive lock . . . easily accessible clutch lever for accurate control of entire operation . . . low-maintenance drive . . . high-capacity feeder . . . interchangeable trap and hopper . . . wide selection of accessories.

Write for new bulletin which describes many other features.

59-3-PO

Representatives in Principal Cities of the World

Barber-Greene BG

Main Office and Plant AURORA, ILLINOIS, U. S. A.

Plants in DeKalb, Illinois..Detroit..Canada..England..Brazil..Australia

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

. . . for more details circle 286 on enclosed return postal card

Major Items in San Ore Construction Company Contract

Item	Unit	Sec. I Quantity	Sec. I Unit Price	Sec. II Quantity	Sec. II Unit Price	Sec. III Quantity	Sec. III Unit Price
Water	M gal.	1	2.00	1	2.00	1	2.00
Common Excavation	cu. yd.	46,500	.30	41,800	.30	51,640	.30
Compaction AA	cu. yd.	109,361	.06	99,548	.06	121,695	.06
Compaction B	cu. yd.	840	.04	1,231	.04	1,245	.04
Aggregate for Aggregate Asphalt Base (AA-1)	ton	146,117	1.40	137,242	1.25	168,548	1.30
Manipulation AA Base	ton	146,117	.80	137,242	.80	168,548	.80
Cutback MC-4	gal.	1,491,333	.11	1,500,759	.105	1,720,286	.11
Aggregate for Surface (AA-1)	ton	26,406	3.75	22,954	3.50	27,603	3.50
Asphaltic Cement (AC-7)	gal.	347,739	.10	303,033	.10	361,082	.10
Aggregate (HM-3 or 4)	ton	51,482	5.50	47,153	5.25	56,935	5.25
Asphalt Cement (AC-5)	gal.	865,973	.10	792,182	.10	973,668	.10
Cutback (RC-4) for Seal	gal.	41,819	.13	37,036	.13	45,901	.13
Cover Material (CM 3, 5, or 7)	cu. yd.	1,864	3.75	1,638	3.60	1,970	3.75
Manipulation (Bit. Seal)	Sta	804.4	2.50	716.00	2.50	887.29	2.50

Contract Data

Sec. 1	7.446 mi.	$1,066,205.06	120 days @ $200.00 penalty
Sec. 2	6.780 mi.	945,576.45	120 days @ $200.00 penalty
Sec. 3	8.402 mi.	1,159,703.92	120 days @ $200.00 penalty
	22.628 mi.	$3,171,485.43	

time temperatures often reach 110° and winter may bring 20° below. Since Nebraska to the north, and New Mexico to the south have somewhat similar problems, Kansas used their experience as a basis on which to judge expected results. For the AA-1 Base (Roadmix) 4% ± of MC-4 cutback asphalt is being used. This percentage of oil reflects a compromise between the Nebraska and the New Mexico methods.

Kansas has had considerable experience with flexible-base pavements. The Interstate project near Wakeeney actually represents a "beefing up" of a design which the Kansas engineers have used with success on many previous projects. This project, designed to higher standards and heavier traffic use, differs principally in the thickness of the base and the type of surface.

The Kansas state department handles its bituminous mixes in three different ways. For leveling or base courses it is normal practice to resort to the travel-mix method and cut backs, as was used on this project. Wherever a higher type base, or a medium quality wearing surface (ramps), is desired, the same aggregates are used but they are hot-mixed in a central plant with asphalt cement. For the wearing surface, a high type asphaltic concrete HM-3 (A) was provided. The principal difference between AA-1 plant mix and road mix is in the type and percentage of asphalt used. Additional control of mix quality can be obtained by varying the in-place density requirements.

The accompanying typical cross-section indicates the major items of work performed. The work has consisted chiefly of the mixed-in-place base courses, shoulder grading, and paving courses. Heavy traffic is provided for with 11-in. total depth of base and 4 in. of wearing surface. The shoulder area is given 3-in. of base aggregate road mix and topped with 3 in. of D.G.S.C. plant-mix, which is approximately the same as the base material except that it is mixed at a central plant. The wearing surface consists of two 2-in. compacted layers of hot-mix asphaltic concrete.

All subgrade which was to be paved is required to have at least a 6-in. depth of compaction, Kansas type AA, with moisture control. Type AA compaction required a density of 95 percent, Standard AASHO test method, with the percentage of moisture controlled so that it was never lower than 5 percentage points below optimum.

Ramps are of similar construction, except that they are only 18 ft. in width and required 4-in. D.G.S.C. hot plant-mix base course, with a 4-in. asphaltic concrete pavement.

● *Water and Compaction.* The grading was performed by other contractors, who were required to secure AA type compaction with moisture control in the top 18 in. of roadbed. The subgrade was reworked only wherever it had been disturbed or had been exposed to the weather for a long enough period to result in deterioration of the compaction.

Since the total amount of water required to secure optimum moisture can vary with weather conditions, the Kansas department and its contractors have a problem in avoiding unbalanced bids in connection with the item for water. The bid schedule for these three contracts listed one item for only 1 M gal. of water with the provision that this item would vary as required.

Moisture conditions were helped by rains, however, it was necessary to add as much as 50 gal. of water per cu. yd. to hold optimum moisture during high temperature and high winds.

The contractor had no trouble in securing ample water, which came from a 180-ft. well at one end of the project. The well pump loaded a 4,000-gal. sprinkler in five minutes. On the other end, water came from ponds and springs—a 7-mile haul. Here a Gorman-Rupp M-16 A centrifugal pump with International J-4 engine loaded 4,000 gal. in three minutes.

(The grading, done between September, 1958, and August 1, 1959, under different contracts required 30 million gal. of water for 2,350,000 cu. yd. of earth moved and proc-

Littleford broom pulled by International 300 tractor—one of three such outfits used to keep pavement surfaces clean. Right, Pettibone-Wood windrow proportioner and Cat 12 grader were standard equipment for aerating, mixing and sizing base course windrows.

essed.) The contractor resorted mostly to watering the fills, but made use of pre-wetting of cuts wherever feasible.

● *Aggregate Production.* Sand aggregate was produced in the various pits by the familiar method of dozing material into a trap over a conveyor belt.

The largest production was secured from a centrally located pit. Cat D8 andD7 dozers fed a Cedarrapids reciprocating feeder loading onto a 130-ft. belt. The material was screened over a Cedarapids 2-deck screen. This plant produced 350 tons per hour early in the season, and was stepped up in late summer to 8,000 tons per day; 1,000 tons for the firm's Barber-Greene hot-mix plant.

The various pits were operated simultaneously to fit job needs. Most hauling was done with 21-ton Omaha Standard and 18-ton Insley bottom-dump units.

The high winds of western Kansas posed a special problem: empty conveyor belts were frequently blown off. The solution was a ½-in. pipe bent in a "U" shape and fastened to the sides of the conveyor with ½-in. cable clamps.

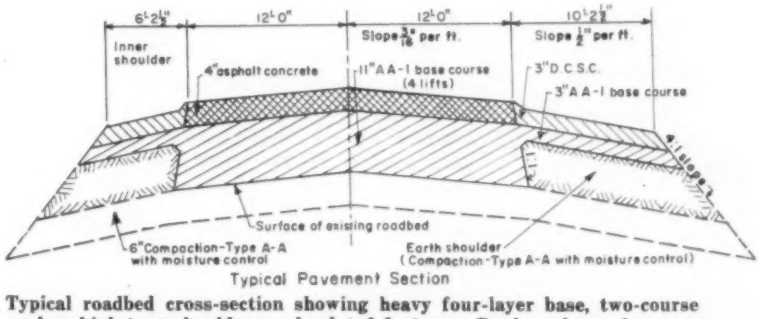
Silica was used to correct for the missing fines in the mix and was produced in the same manner as other aggregates.

● *Base Course Processing.* The first step in base course processing was a careful checking of the centerline grade and the side slopes of the subgrade. Motor graders, operated with extreme accuracy, shaped the roadbed to as near perfection as possible. The shaping of the subgrade was considered of extreme importance since the evenness secured in subsequent lifts was largely based on its accuracy. Wherever necessary the roadbed was rewatered, reshaped and compacted to required standards.

Both the contractor and the engineer were sold on the accuracy of an electronic device for controlling the lateral operations of a motor grader. The Preco Blade Control enabled the operator to maintain an "almost unbelievable" control of the position of the grader blade. While this device required accurate setting and skilled operation, it was considered almost indispensable. Its accuracy often enabled the crew to detect errors in blue-top setting. The device maintains lateral control only, leaving it to the operator to maintain horizontal control. (Project manager Mauser is looking for a similar device to govern *depth* of the blade setting.)

The contractor experienced some difficulty with the original Precos, due to the fact that later transistor models are easily handled by the generating equipment on the Cat 12 graders.

Next was the placing of the base course aggregate. Relying largely on experience as to which combination of pits should be used to secure the proper gradation, the crews placed 35 tons of aggregate per station on the completed subgrade. After the aggregate was in place, it was then necessary to ac-



Typical roadbed cross-section showing heavy four-layer base, two-course paving, high-type shoulders and related features. Dual roadways here are 42 ft. c. to c.

A 5,000-lb. Simplicity hot-mix plant handled part of job. Aggregate for 4-compartment bin fed by two Koehring cranes and Payloader's seen in foreground.

complish a careful blending and moisture control. Blending and aerating were done with a variety of equipment. The standard procedure was for motor graders, working in conjunction with Seaman-Andwall tillers and spring-tooth harrows, to work the windrow from side to side until it had been thoroughly mixed and its moisture reduced to 1 percent.

Fines Control. Control of the "effective fines" is considered one of the secrets of success in using the poor western Kansas aggregate. Specifications require that 40 percent of the minus 200 material must actually pass the 200 screen dry, as an indication of dispersal quality. Experience has shown that this percentage of "effective fines" cannot be obtained unless the moisture content of the windrow during processing is at or below 1 percent moisture content. This requirement has a tremendous effect upon the speed with which the project can be accomplished. With hot, dry weather the contractor was able to process two miles of one full-width roadway lift per day. Frequent rains and thunderstorms in July slowed the work due to an increase of moisture in windrows of aggregate.

The next step was the shaping and further mixing of the windrows. Windrowing was done with motor grader pulling hydraulically operated Pettibone-Wood 820 windrow proportioners. In two or three passes this equipment shaped a windrow to exact predetermined size for a 2-¾-in. compacted lift. These windrows often extended for miles. The state engineers made periodic tests for cross-sectional area, gradation and moisture. Upon satisfactory completion of tests the windrow was ready for the application of the MC 4.

The asphalt mixing train consisted of a Cat D8 with Pettibone-Wood Model 54 road mixer. (Chrysler 54 industrial engine) and a 3,000 gal. Pettibone-Wood tank trailer, Model 3030, with Chrysler engine. Straddling the windrow, this equipment train moved about one mile in five hours.

After application of the asphalt, the windrow was allowed to season and then subjected to further tests. The MC 4 contained about 13 percent kerosene at time of application. Experience showed that the windrow should be mixed and aerated until the volatiles were reduced by about 50 percent in order to allow the best job of laying and to secure the maximum density.

The next operation was a carefully controlled spreading and rolling of the windrow. The spreading was done entirely with motor graders, preferably equipped with the Preco blade control. The need for extreme control was due to the fact that it was impractical to set blue tops for each lift. Experience also showed that it was extremely difficult to correct the grade of any one lift after compaction. It is interesting to note that almost the only trouble experienced with side slope grades occured where the Preco was not used. It appeared that it would have been extremely difficult if not impossible to "eyeball" in the base graders.

The fourth and top lift of the bituminous base was 40.5 ft. wide, taking in the shoulder paving. The only difference in the procedure for this lift was that the aggregate was handled in two windrows instead of one.

Base course rolling was done entirely with penumatic rollers pulled by Farmall tractors, self- propelled pneumatic and sheepsfoot rollers. Upon completion of the rolling, the base course was checked for grade and density.

The subgrade's high degree of compaction made it a good haul road and it did not rut appreciably. The compacted base courses also made a good haulway.

Shoulder Grading. A study of the pavement cross-section will show why it was impractical to begin shoulder grading until the base course had reached 8-in. height. It was necessary to have an accurate profile grade along the edge of the base course at the time this height was reached. Upon completion of the third and fourth lifts of the base couse the engineers set blue tops at bridge approaches. It was possible to make minor revisions at this time, but any extensive change in the base would have been quite costly.

The excavated material for the shoulders was obtained largely from pits along the right-of-way and by laying back the shoulder slopes. Two shoulder grading crews worked simultaneously; one at each end of the project.

Test Methods on Kansas I-70

Sieve analysis	AASHO T 27-46
Material passing 200	AASHO T 11-49
Wear	Article 119.300
Sampling	AASHO T2-46
Shale	Art. 119.100
Clay lumps	Art. 119.100
Coal and Lignite in sand	AASHO T 113-45
Soundness	Art. 119.400
Sampling Bit. Mat.	AASHO T 41-35
% Bit. in Bit. Mixtures	AASHO T 58-37
Plasticity tests	Art. 119.30
Moisture in Mixture	AASHO T-110 or ASTM D-95

ASPHALT

Produced by Esso Standard Oil Company

PROVIDES THREE WAY BENEFITS: Taxpayers, contractors, and motorists – all benefit in three important ways by paving their local roads with Asphalt.

LOWER COSTS FOR THE TAXPAYER. Asphalt can save 10% to 50% in initial construction costs.

EASE OF CONSTRUCTION. Asphalt roads paved in ribbons are completed faster. No expansion joints, forms or curing time required. Contractors can meet faster schedules, obtain contract payments more quickly.

SMOOTHER RIDE FOR THE MOTORIST. Continuous, flexible asphalt paving gives the smoothest ride. Reduces tire hum and vibration to a minimum.

For more information, call or write: Asphalt Products, Esso Standard Oil Company, 15 West 51st St., New York 19, N. Y.

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ASPHALT PRODUCTS

In Industry after Industry..."ESSO RESEARCH works wonders with oil"

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San Ore's Principle Equipment

- 1 Barber-Greene BatchOmatic hot-mix plant and associated equipment.
- 1 Simplicity 5,000-lb. batch plant and associated equipment—Kaw Paving Co.
- 5 GMC trucks and Omaha Standard bottom-dump trailers.
- 15 International trucks and Insley bottom-dump trailers.
- 6 Cat D8 dozers.
- 4 Cat D7 dozers.
- 1 Cat D9 pusher.
- 1 Cat D8 pusher.
- 5 Cat DW21 tractors and 240 scrapers.
- 2 Pettibone-Wood Roadmixers with D8s and tanks.
- 1 Allis-Chalmers HD-5 Loader.
- 1 Allis-Chalmers HD-6 Loader.
- 15 Wheel tractors.
- 13 Cat 12 motor graders.
- 1 Cat 12 motor grader with Do Mor elevating grader.
- 7 Water trucks, 4,000 gal.
- 1 Heavy equipment moving truck.
- 4 Service trucks.
- 11 Pickup trucks.
- 4 Pull type pneumatic rollers.
- 3 Self-propelled rollers—2 Ferguson—1 Tampo.
- 3 Sheepsfoot rollers.
- 1 Buffalo-Springfield 3-wheel roller.
- 1 Buffalo-Springfield tandem roller.
- 1 Buffalo-Springfield Kompactor.
- 1 Galion Rol-O-Matic 3-axle tandem roller.
- 3 Littleford power brooms.
- 4 Pettitbone-Wood Windrow Proportioners.
- 2 Kolman conveyor and screening plants.
- 1 Peerless 36-in.
- 2 Barber-Greene hot-mix pavers—1 10-ft., 1 8-ft.
- 3 Etnyre 1,000-gal. distributors.
- 1 Little Giant crane.
- 1 Marion crane.
- 2 Seaman -Andevall pulvamixers.
- 2 Lincoln welders—300 amps.
- 6 Thurman scales.
- 3 Barber-Greene hot-mix pavers (Kaw Paving Co.).
- 1 Buffalo-Springfield 3-wheel roller (Kaw Paving Co.).
- 2 Buffalo-Springfield tandem rollers (Kaw Paving Co.).
- 43 Leased trucks:
  - 7 International drawn semi-trailers.
  - 5 International R 200s with Model 112 Meinholdt trailers.
  - 31 Dump trucks.

(Above does not include Reno Construction Co. crushing and hauling equipment.)

● *Notes on Grading.* Grading on the west end was performed with Cat DW21 tractors and 240 scrapers using a D8 pusher. All compaction on the west end was done by sheepsfoot roller with wheel tractor.

While some scrapers were used on the east end, most of this grading was done with a Model I U 1349 Ulrich Do Mor 22-ft. elevating grader mounted on a Cat 12 patrol blade. The dirt was hauled in five Meinholdt Model 112 bottom-dump trailers hitched to International R-200 trucks. Compaction on the east end was secured similarly with sheepsfoot rollers, supplemented by a Buffalo-Springfield Kompactor. (Referred to as "Old Paddle Foot.")

It was necessary that extreme accuracy be secured on the grade of the shoulder as the fourth layer of base course extended over the shoulder. This close tolerance was again met with a specially-equipped motor grader. The practice was for the blade operator to take his grade off the blue tops and with the aid of the control device, carry the proper slope. The earth shoulders required the same compaction as the subgrade, type AA with moisture control.

Ulrich Do Mor elevating grader on Cat 12 shown heaping 10 cu. yd. of material on a Meinholdt bottom-dump truck for shoulder grading. Five loads in 8 minutes in good going.

Hot-Mix Plants. The contractor used two hot-mix plants, giving a combined production of 2,800 tons per 10-hour day. One located near a large sand deposit, was built around a 5,000-lb. Simplicity batch plant. Equipment included a Koehring 304 (¾-yd.) a 305 (1-yd.) crane, a Hough Payloader and necessary belts and dozers. Power came from a Cat D-326 series F electric set.

Midway along the job was the second plant, a Barber-Greene BatchOmatic—the same plant which in 1957 helped pave the face of Montgomery Dam in Colorado (20,000 tons of mix) and in 1958 supplied Colorado road jobs. This plant handled a 6,345-lb. batch including asphalt.

Off-job haul roads were not a problem due to careful maintenance of the completed base as a haulway. Where hauls were over dirt roads, San Ore's sprinklers carefully controlled water so that dust was settled without making dangerously slippery conditions. Motor graders worked unsurfaced haulways intensively, with alertness to maintaining good side drainage, to prevent ponding and resultant ruts.

The surface course was laid in two layers using Barber-Greene finishers. Breakdown rolling was done

Graduation for Hot-Mix
on Kansas I-70 Job

	Surface (A)	(B)
Retained on 1"	0%	0%
Retained on ¾"	0-5	0-5
Retained on ⅜"	15-30	25-40
Retained on No. 4	30-48	40-60
Retained on No. 8	40-58	50-68
Retained on No. 16	54-68	62-76
Retained on No. 30	63-75	70-83
Retained on No. 80	80-87	84-91
Retained on No. 200	91-95	92-96
(Using any acceptable filler except silica). No. 200 using silica	92-96	93-97
Plastic Index, not more than	3	3
Moisture in final mixture, Maximum	0.35%	0.35%

Graduation for Base Course
AA-1 Road Mix and Surface Course AA-1 Plant Mix

Retained on 1½"		0%
Retained on 1"		0-15
Retained on ⅜"		5-30
Retained on No. 8		20-50
Retained on No. 30	not more than	80
Retained on No. 200		88-94

There shall be not more than 25% of material between any two successive sieves in the total series (1½", ¾", ⅜", 4, 8, 16, 30, 50, 100).

with Buffalo-Springfield and Galion steel-wheel rollers, final rolling was with heavy self-propelled pneumatic rollers.

A 1,000-gal. Etnyre distributor mounted on an International S-180 truck applied a tack coat of MC-4 between each of the lifts on the subbase, and applied RC-1 ahead of the surface course. Tack coats were 1/20th gal. per sq. yd.

Seal coating was confined to the shoulders only, using RC 4 with local aggregate.

Subcontractors. San Ore employed four subcontractors on this project. Reno Construction Co., of Kansas City, Mo., subcontracted crushing and hauling from a quarry 26 miles distant. Reno used a Northwest 80D shovel to feed a Cedarapids impact breaker, and a Symonds cone crusher and a Cedarapids screen to finish out the crushed aggregate.

Kaw Paving Company, of Topeka, Kansas, furnished the Simplicity hot-mix plant, with San Ore taking the responsibility for the production of design mix.

Klaver & Wallace, of Kingman, Kansas, subcontracted all concrete work, and Lester L. Frick Company, of Assaria, Kansas, the guard rail.

Random Observations. The primary reason for the contractor's intensive search for additional aggregate pits was a simple one. The company leaders realized that costs could be cut greatly by reducing the haul. Further, that if they could find several pits, one exactly suitable, they could still save money by blending to obtain specification aggregate.

Roscoe Wall, resident engineer for the State Highway Commission at Wakeeney, stressed uniform moisture content and made every effort to see that water was evenly applied over any area being processed. Since this was not an end-result specification, the contract contained items for type AA compaction, type B compaction, and an item for water. Compaction was paid for on a cu-yd. basis.

Surfacing work on this 20-mile project was started May 4 and should be finished by November 1, 1959. All asphaltic work must be completed by October 1, since specifications forbid placement at below 40° temperature. Sections I and III were put on a 120-day working schedule starting May 4, but given extension to November 1, due to delay by the grading contractor.

Resident engineer Wall, and superintendent Mauser had a practical arrangement for keeping track of working days. The basis was to come into complete agreement as to the working days which should be charged for any particular week, doing so within the week following.

The contractor's supervisory personnel made almost constant use of the two-way Motorola radios in their pickup trucks. The trailer office had a Motorola Compa-Station with a high antenna. This set made it possible to monitor all of the conversations between supervisors.

Rainy weather plagued the contractor from the start. As of the middle of July, the project was 26 working days behind schedule. An extra crew was expected to be added for the last 30 days of the work concentrating on Section II where grading was late.

Acknowledgments. The construction work on this Interstate 70 project has been directed by Roy Mauser, now completing 32 years with San Ore. Roscoe W. Wall is project engineer for the state of Kansas.

Skimming grade preparatory to placing first subbase course. Cat 12 grader seen pushing DW 21-No. 470 tractor-scraper combination.

Asphalt Institute Declares War on Lagging Practices

Objectives: adoption of more adequate thickness designs, better rolling specifications, more attention to base strength and drainage, elimination of tests that have no quality meaning.

The Asphalt Institute has launched a drive to enlist general engineering support for important advances in asphalt pavement design and construction criteria. Thicker asphalt sections, tighter compaction specifications and better drainage of multiple-highways are key elements in the Institute program.

In line with continuing efforts toward refinements in asphalt specifications, the Institute also announced the scrapping of the obsolete Loss on Heating Test, to be replaced by the Thin Film Oven Test.

John M. Griffith, Engineer of Research at the Institute, explained that the Thin Film Oven Test provides a better indication of asphalt quality than the abandoned test.

"The weight loss on heating actually is irrelevant in itself," said Griffith. "The critical factor to be determined is whether the heating results in a significant loss of penetration. Does the heating produce undue hardening of the asphalt in plant operations? The Thin Film test in indicative of such hardening and, consequently, it is replacing the Loss on Heating Test in all Asphalt Institute specifications for asphalt cements."

The need for thicker asphalt sections and closer control of compaction was emphasized by Chief Engineer Arvin S. Wellborn in announcing the Institute's "Advanced Design Criteria for Asphalt Pavements."

"Because of the many variable factors entering into the design of asphalt pavement structures," he said, "design methods have been evolved around simplified empirical procedures. While these design methods have served well during the past, the increasing stresses now being imposed on asphalt pavements by modern, heavy traffic with higher tire pressures have indicated certain aspects where improvements in design must be made.

Asphalt Base Course. "To meet the demands of present and future traffic on heavily-traveled roads, the Institute strongly recommends the inclusion of an asphalt base in addition to a 4-inch minimum thickness of asphalt concrete in the surface and binder courses.

"Asphalt base is nothing new," Wellborn pointed out. "In fact, the history of asphalt base construction is virtually the history of asphalt paving in the United States. It was used in city streets up to fifty years ago, and for the same reason we are urging its greater use in rural roads today—to sustain concentrated wheel traffic and prevent capillary water and moisture vapor from weakening the portion of the structure where high strength is needed. The performance record of most of these veteran streets and roads documents our case for broader use of this design for the future."

Similarly, the Chief Engineer of The Asphalt Institute pointed out that modern channelized heavy traffic calls for tighter compaction specifications.

"Asphalt pavement courses," he said, "should be compacted with rollers which apply contact pressures equal to or greater than those applied by the traffic which will use the pavement. Present day trucks are equipped with tires which, under legal axle loads, stress the pavement with average contact pressures as high as 100 psi or more. To prevent further compaction and to prevent rutting in channelized traffic areas, the pavement must be compacted with equal or greater contact pressures."

Wellborn cited performance of the well-publicized Columbus Air Force Base test section in 1958 as clear-cut evidence that proper compaction is the key to sound pavement service life under extremely heavy wheel loads at very high tire pressures.

The Asphalt Institute spokesman singled out adequate drainage as a third design and construction feature which deserves some considered review.

"The Institute drainage criteria also call for depressed medians for divided highways. Experience with post-World War II multi-lane highways," said Wellborn, "has demonstrated the value of this design as an aid to proper drainage of such roadbeds."

Keep Tab on Your Equipment Interest

The allocation of debt payments can have a serious effect upon the tax consequence of debt. For instance, if a firm repays money borrowed for any purpose, including installment payments on equipment, the repayment is not a deduction. However, all interest which is paid is deductible, reminds a bulletin of the Virginia Road Builders Association.

In order to secure such a deduction all debt payments of whatever nature should be allocated to stipulate the part of the payment which covers the principal and that which covers the interest. By so doing the taxpayer can avoid controversy with the Internal Revenue Service as to unallocated payments. The usual assumption is that the interest is paid first and the remainder of the payment is credited to principal. Allocation for the convenience of the taxpayer can change the ratios to the mutual benefit of both.

HOW gravel producer gets 147,160 miles from truck before overhaul

Teamwork and good lubrication are the key, Guaranteed Gravel & Sand Company finds

In April, 1954, a Harvester R-190 12-ton dump truck was put into service hauling gravel. In November of 1956, after 147,160 miles, the unit was overhauled and reconditioned. Bearings and crankshaft were in excellent condition and total engine cleanliness was good. Just before overhaul, gasoline mileage was 5.3 miles per gallon, oil consumption was exceptionally low. STANOLUBE HD-M was the motor oil during all of this 2½ year service period.

STANOLUBE HD-M Motor Oil quality starts with base stock which is especially selected. To this carefully refined base stock, additives developed by Standard Oil research are blended in. These additives retard oil oxidation, minimize formation of piston and ring deposits, prevent formation of excessive varnish and sludge and prevent corrosive attack on bearing metals.

The use of STANOLUBE HD-M Motor Oil by this Mankato, Minnesota, aggregate producer, began in 1953. At the start Standard Oil lubrication specialist Earl Kommerstad analyzed the lubrication requirements of all of the company's equipment and helped the management set up a maintenance program. Proper service intervals and drain periods were the first step. The result is an operation that can get 147,000 miles out of equipment.

Is this the sort of help you'd like? Get it by calling the lubrication specialist in the Standard Oil office near you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

You expect more from **STANDARD** *and you get it!*

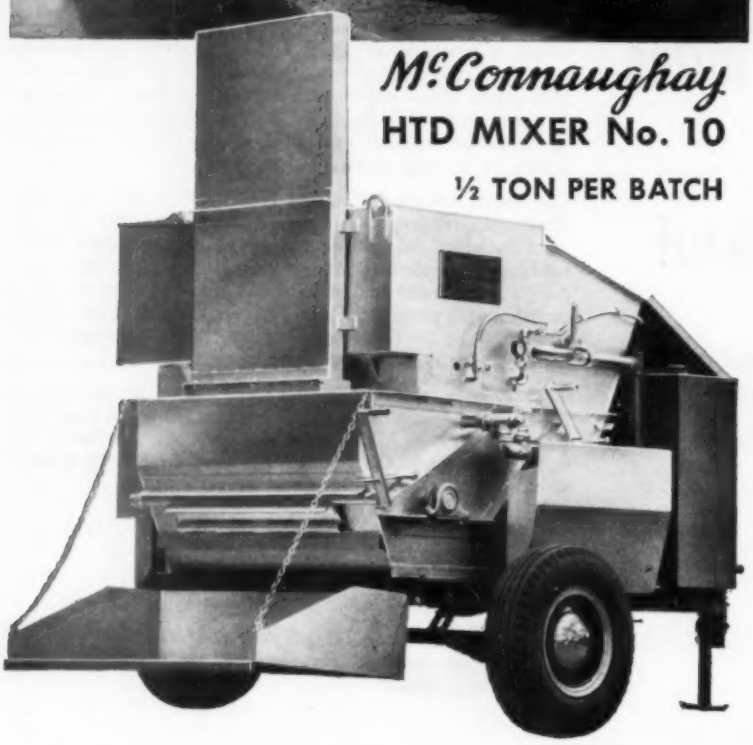
Old #33, the truck that went 147,160 miles before its first overhaul. Driver Elmer Gaetke and Standard's Earl Kommerstad take a look at the engine. Earl knows how to help customers get top performance from automotive equipment. He's had five years' experience in such work with Standard. In addition, Earl has studied engineering at Augsburg College and the Univ. of Minn.

Quick facts about

STANOLUBE HD-M Motor Oil

- Refined from highest-quality, solvent-extracted base stock.
- Contains special additives that prevent bearing and bronze wrist-pin bushing corrosion, reduce piston ring varnish and keep rings free to seal against blow-by.
- Contains still other additives that reduce wear on heavily stressed parts.

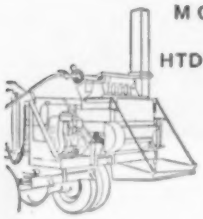
McConnaughay
HTD MIXER No. 10
½ TON PER BATCH

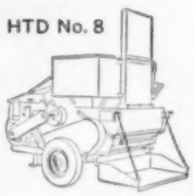


No Other Asphalt Mixers Can Do All These Things So Effectively

You can use a McConnaughay Mixer to reactivate and heat stock pile mixtures... prepare cold asphaltic mixtures... prepare hot asphaltic mixtures... dry various types of wet aggregates quickly, thoroughly... remove *both* moisture and solvents from bituminous mixtures... produce bituminous mixtures with tars, paving asphalts, cut-back asphalts, and emulsified asphalts. McConnaughay Mixers, operating under U. S. Patent No. 2,626,875, are authorized to mix emulsified asphalt and aggregates in the presence of flame and heated gases. Write for details and specifications.

MODELS TO MEET ALL REQUIREMENTS





McCONNAUGHAY MIXERS, INC.—LAFAYETTE, IND.

National distributors: Asphalt Equipment Co.
3314 Cherry Lane, Fort Wayne, Indiana

. . . for more details circle 334 on enclosed return postal card

Manufacturers' Literature

ASPHALT PAVER FEEDERS: A 4-page bulletin, available from Koehring Company of California, 2200 Country Boulevard, P. O. Box 1891, Stockton 4, Calif., describes "Clark" asphalt paver feeders, Models 4590 and 6009. Bulletin describes and illustrates the equipment used with pavers and the "Clark" windrow sizers.

For more details circle 159 on Enclosed Return Postal Card.

FLEXIBLE COUPLINGS: A recently revised bulletin on roller chain flexible couplings (Bulletin 597) has been published by Chain Belt Company, Milwaukee, Wis. It outlines service advantages, presents information on how to select flexible couplings, and illustrates installation and maintenance procedures.

For more details circle 160 on Enclosed Return Postal Card.

CONCRETE FORMING: A new 16-page booklet titled "Universal Concrete Forming News" has been released by Universal Form Clamp Co., 1238 N. Kostner Ave., Chicago 51, Illinois. Items of interest to contractors and engineers engaged in concrete forming are featured along with numerous illustrations. A copy is available without charge.

For more details circle 161 on Enclosed Return Postal Card.

CONSTRUCTION PRODUCTS: Revision and reprinting of "Products for the Construction Industry" bulletin has been announced by the Sales Promotion Department, Le Roi Division, Westinghouse Air Brake Co., Milwaukee 1, Wis. Several new photographs and additional information on the Le Roi line of rotary and piston type portable air compressors, the improved "Tractair"—a combination tractor and air compressor, and air tools are included in the current edition.

For more details circle 162 on Enclosed Return Postal Card.

MOTOR GRADERS: "More For Your Money" is the title of a new brochure describing the L-W line of motor graders and produced by LeTourneau-Westinghouse Company, 2301 N. E. Adams St., Peoria, Ill. The brochure describes the operational and design features of the L-W motor grader line, consisting of seven models of graders ranging in horsepower from 67 to 190-hp.

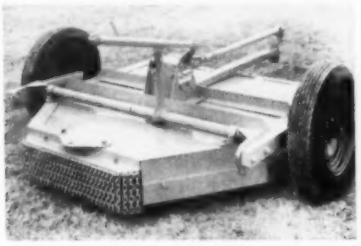
For more details circle 163 on Enclosed Return Postal Card.

New Products

Rotary Mower

Danuser Machine Works, Inc., Tulsa, Oklahoma announces a heavy duty 5-ft. trailor-mounted rotary mower designed to meet highway specifications. Weighing over 800 lb., the unit has hardened spring steel free swinging blades with side constructions of 5/16 heavy duty angle. The gear box is of malleable construction.

A safety chain arrangement provides maximum safety for mowing along



Danuser Mower

highways or in congested areas. The chains across the front and rear of the mower prevent materials from being ejected at high velocity and are said to assure maximum safety for the operator. Danco also manufactures a complete line of heavy duty center mount mowers which are being used successfully throughout the United States and in foreign countries.

Danuser Machine Works, Tulsa 14, Okla.

For more details circle 140 on Enclosed Return Postal Card.

Portable Heater

A new portable heater from the White Manufacturing Company has a 2-pass stainless steel combustion chamber that burns out all objectionable odor and smoke and permits clean, ordorless operation, the maker states. Air is supplied by a furnace-type blower and motor direct-coupled to eliminate v-belts. Fuel tank has capacity for 14 hours of continuous burning when unit is equipped with thermostat. Three-way shut-off valve is said to eliminate smoke and odor on shutdown and on intermittent operation when used with a thermostat.

White Portable Heater

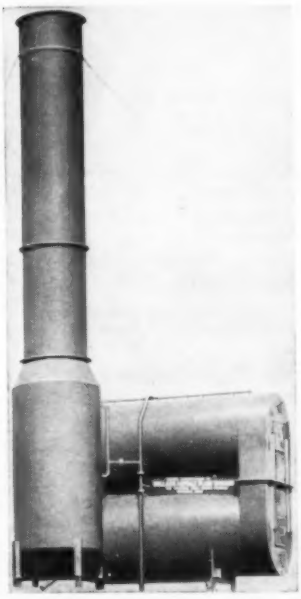
White Manufacturing Company, Elkhart, Indiana.

For more details circle 141 on Enclosed Return Postal Card.

Dust Washer

Three-way cleansing principles of the new Bollard dust washer consist of "baffle, spiralize and scrub." Baffling serves to delay and change exhaust flow direction, aiding in the separation of particles. Spiralizing is a forced swirling motion which throws particles to catch on a wet surface, while scrubbing is a series of interlaced, adjustable water spray patterns to filter out particles from swirling gas.

Number and sizes of spray nozzles, plus direction and pressure of spray



Bollard Dust Washer

patterns provide correct droplet size, distribution, and velocity to most effectively wet and "scrub" entrained particles. Impingement action traps all sizes of dust particles, the manufacturer states, and cleaned exhaust passes out stack. Continuous downward flushing of internal surfaces makes the unit self cleaning. Three models are available and can be mounted at grade or on elevating suport structure or engineered to adapt to existing plant operations.

Bollard Asphalt Plant Division of the Colonial Iron Works Co., 17649 St. Clair Ave., Cleveland 10, Ohio.

For more details circle 142 on Enclosed Return Postal Card.

26 mph Tractor Shovel

A new 26 mph, 1 cu. yd. capacity Model 55-A "Michigan" Tractor Shovel is announced by the Construction Machinery Division of Clark Equipment Company. The unit has four-wheel drive, and all other big machine features carried as standard equipment on the five larger models of this type, including the "Michigan" power train.

"Michigan" Tractor Shovel

Features of the new unit include all-wheel drive for city and county use, a 66.5 hp gasoline engine and a working weight of 10,500 lb. It will lift and carry up to 7,000 lb. The Model 55-A features four-speed forward and reverse power shift transmission, planetary wheel axles and torque converter as standard equipment. Other features include bucket indicators and double acting cylinders that increase bucket digging ability.

Construction Machinery Division, Clark Equipment Company, Pipestone Rd., Benton Harbor, Mich.

For more details circle 143 on Enclosed Return Postal Card.

Pick-Up Trailer

Construction personnel can now "sleep out" on the back of a pick-up truck with "The Dreamer" a custom-built coach, produced by Coons Custom Coach Mfg. Co. The manufacturer states that one man can install the unit in 15 minutes. Said to be the lightest coach made, the unit is available in three basic models.

The coach is constructed of kiln-dried white pine covered with aircraft aluminum skin painted to match the truck

Coons "Dreamer"

IF YOU MAKE EMULSION MAKE EMULSION PAY

Install the Charlotte Colloid Mill for Emulsified Asphalt

for complete information call or write

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55 HERRICKS ROAD, GARDEN CITY PARK, L.I., N.Y.

... for more details circle 294 on enclosed return postal card

Rooms & Suites

... to please the most discerning at the BELMONT

Overlooking Lake Michigan and Belmont Yacht Harbor. 12 minutes from the loop—direct busses at the door. Spacious parking. New Banquet and Meeting rooms accommodate up to 400 persons.
Charming, new Mansion House Dining Room and unique Cocktail Room—The Dam Site.

700 Rooms & Suites
TRANSIENT & PERMANENT
Full Hotel Services
Singles . from $8
Doubles . from $11

F. J. PETITMAIRE
General Manager

Belmont Hotel

BITTERSWEET 8-2100
3172 NORTH SHERIDAN ROAD
CHICAGO

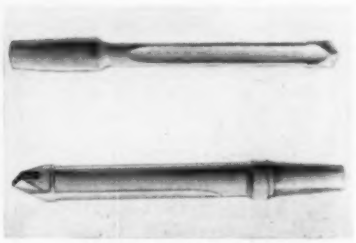
color. The jig-built aircraft type construction is said to make them lightweight but durable. Coaches are fully insulated for summer or winter. Birch finished interiors include complete galley with self-contained water system and icebox plus dining area that converts into sleeping arrangement for three.

Coons Custom Coach Mfg. Co., Oswego, Kan.

For more details circle 144 on Enclosed Return Postal Card.

Carbide Hammer Bits

Recently introduced "Rocket Thrust" carbide tipped hammer bits have outlasted ordinary star drills by 300 percent, states the manufacturer, Modern Manufacturing Co., Inc. Tests show that 500 linear inches can be



Modern Mfg. Bits

drilled with the carbide tipped hammer bit without resharpening. Carbide tipped drills are made for reciprocating hammers and rotary drills and are available from ⅜ in. diameter up to 1 in. diameter.

Modern Manufacturing Co., Inc., 680 Davisville Rd., Willow Grove, Pa.

For more details circle 145 on Enclosed Return Postal Card.

Three New Ladder Series

A complete line of aerial ladders recently announced by Truck Equipment Company includes three new series—the TML, TEL, and TFPL. It was developed for use by power companies, city street and stop-light maintenance crews, tree surgeons, telephone companies, building contractors and others having overwork. "Truco" is the trade name.

The "Truco" Manual Aerial Ladder

Features include upper ladder section handrails built into fiberglass to insulate workers from high voltage contact, a tri-plane basket to give workers a flat surface regardless of ladder angle, a check valve in the hydraulic raise system to slow descent of the ladder if the hydraulic system is damaged, and ladder heights from 24 to 45 ft.

The manual unit (TML Series) uses sturdy counterbalance springs to absorb 70% of the weight in raising the ladder. A hand-operated hydraulic system furnishes needed power to raise the ladder. Rotation is through 360°, with all low-friction bearings. Ladder locks in any desire position of raised or rotation.

The hydraulic-electric unit (TEL Series) is raised by hydraulic-electric power furnished by a 12-volt DC motor operated from the truck battery. Integral low-friction bearings, heavy-duty worm gear box and a hand wheel provide rotation through 360°.

The TFPL Series is fully powered in all movements — extension-retraction, elevation, and rotation. Push button controls are available for both top and bottom of ladder to facilitate operation. Power is furnished through a 12-volt DC motor operated from the truck battery.

Truck Equipment Co., 3963 Walnut St., Denver 5, Colo.

For more details circle 146 on Enclosed Return Postal Card.

Road Leveling Unit

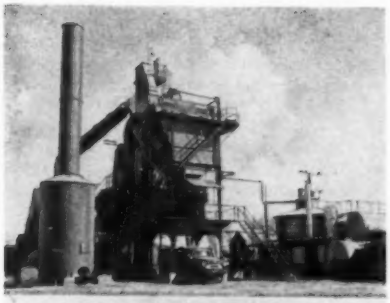
A new road leveling implement, the C-126 DI Road Planer, announced by Speedline Implement Mfg. Co. employs a patented spring equalization action, which permits a constant cutting and filling action said to eliminate gouging and excess dumping and minimize gravel segregation.

Speedline Road Planer

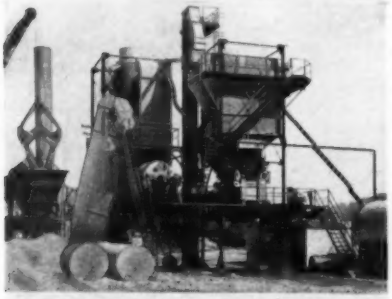
Unit is 25 ft. long and has a 2½-cu. yd. capacity bucket suspended at four points and controllable manually or hydraulically. Other features include a 10-ft. reversible cutting blade, crank type stops, depth gauge, elevated tongue structure, and dolly carriage.

Implement Mfg. Co., Las Cruces, New Mexico

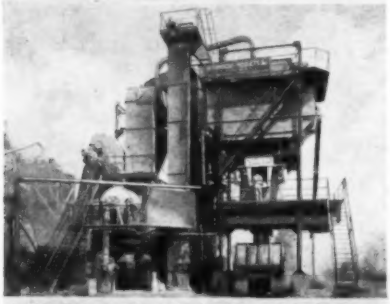
For more details circle 147 on Enclosed Return Postal Card.



Asphalt Products Company's Model S-80, the sixth Simplicity bought by Dick Shorts of Youngstown, Ohio.



Barrett Division's Model S-100 at Cincinnati, Ohio.
This is Barrett's fifth Simplicity.



Model S-200 of Bituminous Products, Buffalo, N. Y., their fourth Simplicity.

FACTS vs ARGUMENTS

Get the FACTS and NOT THE BULL on two important points before you buy any asphalt plant. The outstanding success of the Simplicity S-200 has caused claims (verbal) that our S-200 is our S-100 speeded up. Here are the FACTS:

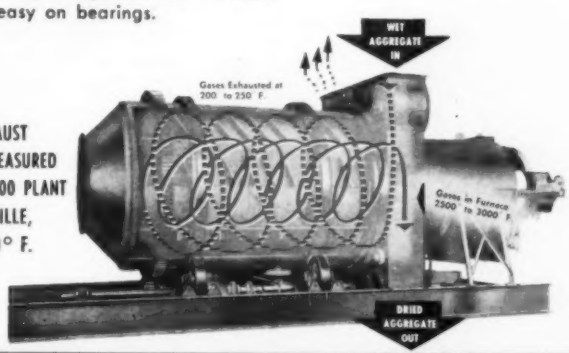
Model	S-80	S-100	S-200
Rated Capacity (T.P.H.)*	75 to 100	100 to 150	150 to 200
Dryer Volume (Cubic Ft.)	603	1,018	1,571
Dryer Speed (R.P.M.)	12	11	9
Air Volume (C.F.M.)	30,000	35,000	40,000
Fan Speed (R.P.M.)	900	800	800
Screen Area (Sq. Ft.)	96	140	180
Screen Speed (R.P.M.)	800	800	800
Bin Capacity (Tons)	50	50	85
Weighing Capacity (Lbs.)	6,000	7,500	10,000
Mixer Capacity (Lbs.)	5,000	6,000	8,000
Mixer Volume**	50.63	65.6	93.1
Mixer Speed (R.P.M.)	56	50	45
Total Weight	187,385	228,865	262,535
Total Price*	$94,500.00	$116,400.00	$132,800.00
Price Per Pound	.504	.508	.505

* Prices subject to change without notice. ** Cu. Ft. Below Shafts.

The only Dryer that starts at once without "warming up" . . . stops immediately without "cooling down"! Aggregates exposed to hot gases for twice the length of time. Aggregates placed in path of hot gases by cross showering.

Fuel bills are lowered 30% or more and any mechanic knows a horizontal Dryer is easier to operate and keep in top condition . . . takes less power, is easy on bearings.

RED LINES show flow of aggregates through outer and inner shells. Hot gases in inner shell are INSULATED and ABSORBED by cold wet material in outer shell.



ACTUAL EXHAUST TEMPERATURES MEASURED JUNE 1959 ON S-200 PLANT AT DOUGLASVILLE, GEORGIA--180° F.

There's a
SIMPLICITY PLANT NEAR YOU
On request, we'll be glad to send you the name and location of a nearby installation.

DEPENDABLE

THE SIMPLICITY SYSTEM

FROM BUILDER TO BUYER BETWEEN MEN WHO KNOW

THE SIMPLICITY SYSTEM CO.

SHOLAR AVENUE PHONE MAdison 2-2144

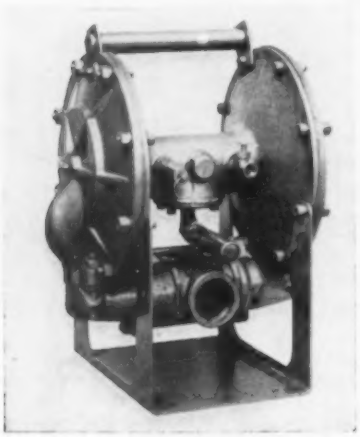
CHATTANOOGA 6, TENNESSEE

. . . for more details circle 347 on enclosed return postal card

New Products

Utility Pump

"TXT" utility pump operates on 5 or more lb. of air or gas pressure, develops a discharge pressure of 60 psi and has a maximum volume of 70 bph. The unit, produced by Texsteam Corporation, will pump slurries and heavy abrasive fluids such as encountered in sumps and ditches without difficulty, and is also used for recycling, transferring and many other services, the manufacturer states. The product is a



Texsteam Utility Pump

double acting diaphragm pump, with powering pressure entering through a single chamber to connect the two diaphragms. A reversing valve switches pressure from one diaphragm to the other, providing continuous suction and discharge without lost strokes or lost motion. As one diaphragm is discharging, the other is on the suction stroke loading the chamber for discharge. The input to output ratio of the pump is approximately 1 to 1. Its weight is 61 lbs.

Texsteam Corporation, 320 Hughes St., P.O. Box 9127, Houston 11, Texas

For more details circle 148 on Enclosed Return Postal Card.

Truck Body

A new, all-purpose body for 1-ton trucks is announced by Leland Equipment Company as a unit designed for "in-between loads": too heavy to manage by hand and too light to handle economically with 1-½ and 2 ton trucks.

The new body offers minimum maintenance and operating and insurance costs, the manufacturer states.

Leland "Junior" Truck Body

Features include a rolling tail pipe of 4½ in. O. D., gin poles of 2⅞ in. O. D., headache rack of 1-½ in. and 2 in. pipe and an "A" frame provided for the top of the gin poles. Winch and body mounting brackets are standard equipment. Body length from the front to the tail roller is 8 ft.; length behind the winch is 6 ft., 4 in., width of the body is 90 in.

Leland Equipment Company, 408 N. Main, Tulsa, Okla.

For more details circle 149 on Enclosed Return Postal Card.

Multi-Use Mixer

Four angles to allow every type of mixing is the exclusive feature of a mixer announced by Kol, Inc. which

Kol Mixal Mixer

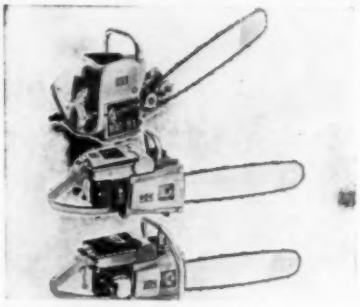
is said to mix everything from coarse aggregate concrete to thin slurry mixes. For operation: correct angle for the mixing drum is selected, mixer is activated for about two minutes, then pail is removed and mix is ready to be poured. Enough mix for an 8-ft. by 3-ft. sidewalk can be prepared in one hour, the manufacturer states. Unit is compact and easily portable.

Kol, Inc., 2323 Ellis Ave., St. Paul 14, Minn.

For more details circle 150 on Enclosed Return Postal Card.

Chain Saws

A new line of six chain saws has been announced by McCulloch International, Inc. The line is composed of the "Mac 35", a gear-drive chain saw; the 1-40 direct-drive model; the 1-50, a more powerful direct-drive saw; the 1-70, the fastest, most powerful direct-drive saw in the line; the 1-80, most



New McCulloch Saws

powerful gear-drive one-man saw; and the 99, a heavy-duty two-man saw.

The new saws have been subjected to demanding performance checks, including operating them in both extreme desert heats and arctic temperatures, the manufacturer states.

McCulloch International, Inc., c/o Stromberger, LaVene, McKenzie, 3325 Wilshire Blvd., Los Angeles 5, Calif.

For more details circle 151 on Enclosed Return Postal Card.

Fast Printmaking

Directly from translucent originals, strong blue line reproductions can be printed with Eugene Dietzgen Company's high-speed "Diazo" blue. Developed dry with aqua-ammonia vapor, these easy to read prints are ready for use, the manufacturer states.

"Driprint" Blue is said to have superior density and good contrast, giving excellent prints from pencil tracings and poor originals. It is said to be ideal on low powered light source machines for all types of reproductions and on high speed machines from poor or soiled originals.

Eugene Dietzgen Co., 2425 N. Sheffield Ave., Chicago 14, Ill.

For more details circle 152 on Enclosed Return Postal Card.

SWENSON SPREADERS for ICE CONTROL and RESURFACING

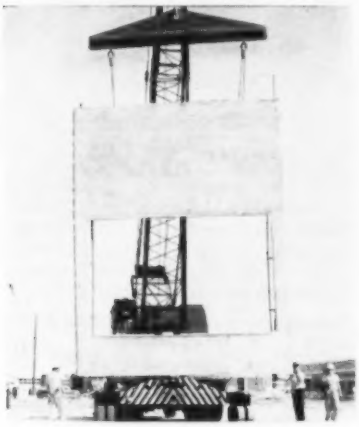
Handle all granular materials . . . salt, cinders, sand, calcium chloride, rock chips. Lay narrow strip or full traffic lane. Speeds to 30 M.P.H. Steady or intermittent for hills and intersections. Hydraulic and mechanical control. Write for complete information.

SWENSON SPREADER & MFG. COMPANY
Lindenwood, Illinois

. . . for more details circle 353 on enclosed return postal card

Outrigger Wheel Unit

A tandem, pivotal action wheel assembly that will permit a crane to move with the load over level and rugged terrain is announced by Lincoln Welding Works, Inc. The "Rolling Outrigger", designed to fit all makes and models of truck cranes, eliminates set-



Lincoln Outrigger Wheels

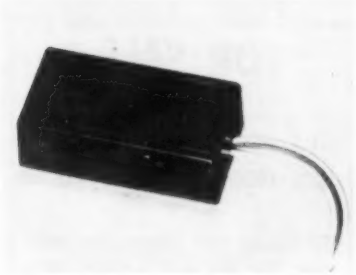
ting and re-setting of outriggers and pads, permits greater load distribution and prevents over-stressing of the crane carrier. The new tandem pivotal wheel action has been tested on long stick operations and in warehouses and factories where greater mobility was needed.

Lincoln Welding Works, Inc., 1320 "A" St., Las Vegas, Nev.

For more details circle 153 on Enclosed Return Postal Card.

Flasher Converter

Pacific Mercury has introduced a new low cost conversion unit to convert obsolete flasher warning lights into up-to-date units that meet national and local safety standards. PM's WC-5 is

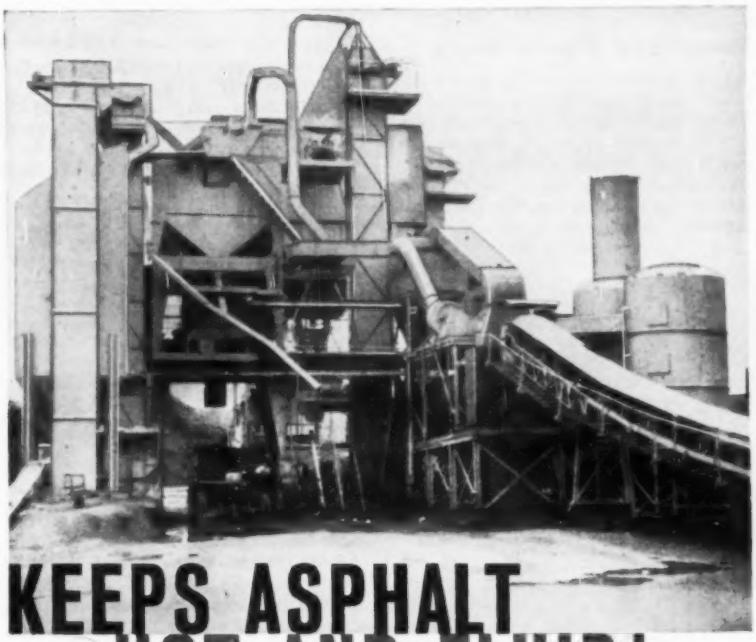


PM Flasher Converter

a complete transistorized incandescent flasher circuit in a compact plastic container. It is said to install quickly with the connection of only 4 wires.

Pacific Mercury, 14052 Burbank Blvd., Van Nuys, Calif.

For more details circle 154 on Enclosed Return Postal Card.



KEEPS ASPHALT HOT AND FLUID!

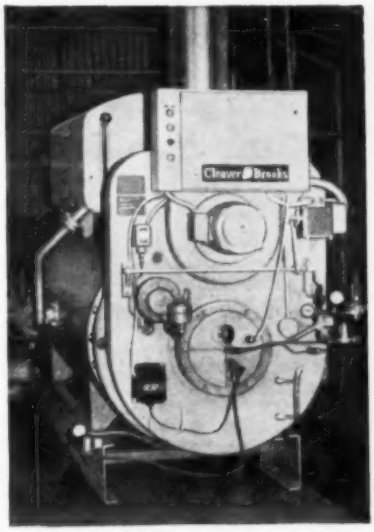
Cleaver-Brooks Peak-Temp oil heater proves to Sowerbutt Asphalt Inc. that keeping asphalt hot at 325° F is easy and profitable year around.

Here's what Jim Fulmer, superintendent of Sowerbutt Asphalt Inc., Paterson, N. J., said recently about his 1,200,000 btu Cleaver-Brooks Peak-Temp oil heater: "We supply upwards of 50,000 tons of asphalt mix a year for state, county, and local governments and for contractors in the area. Our Peak-Temp oil heater heats asphalt in 20,000 gallon storage tanks and heats jacketed lines from the tanks. It's operated night and day seven days a week, winter and summer. We just check the heater occasionally. This is the kind of reliability in equipment we want."

No water or steam problems with Peak-Temp oil heater, either. High flash point heat transfer oils circulate, raise and maintain asphalt temperatures faster than steam. And Peak-Temp oil heater's forced circulation design prevents hot spots, assures long operating life.

This versatile heater speeds curing of concrete used in precast and prestressed structural members. Easily adapted to controlled heating of plastics and residuals.

For full information on Peak-Temp oil heater write Cleaver-Brooks Company, Dept. L, 395 East Keefe Avenue, Milwaukee 12, Wisconsin.



Cleaver Brooks®

ORIGINATORS AND LARGEST PRODUCER OF PACKAGED BOILERS

. . for more details circle 297 on enclosed return postal card

Power and Blower Units

New, lightweight portable power and blower units have been introduced by United States Motors Corporation for a wide variety of on-the-spot electric power applications, ventilation needs, and exhausting purposes. A dependable source of electric power for lights, portable tools and needs of other

U. S. Motor Blower

electricaly driven equipment, is provided by the air cooled generating sets. The generators, which meet A.I.E.E. and N.E.M.A. standards, are available in two sizes—1250 watts, 115 volt alternating current; and 1350 watts, 125 volt direct current. Each weighs less than 100 lb., and can be easily carried in the field by one person.

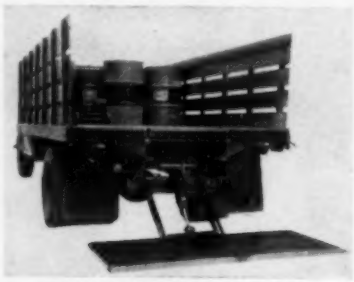
United States Motor Corporation, Oshkosh, Wis.

For more details circle 155 on Enclosed Return Postal Card.

Tailgate Loader

An electric tailgate loader with capacity of 1,500 lb. is available from the Santa Anita Mfg. Corp. The loader is said to be applicable to all ¾ to 2½-ton trucks.

Load slides into truck from ramping gate which slopes down to ground level at the rear edge when lowered. As the gate raises, it levels off to hold



Santa Anita Tailgate Loader

tail loads steady and firm. Safety latches hold tailgate in upper position so loads can be carried on the tailgate without losing hydraulic power. Vertical travel is 48 in., net weight is 500 lb.; platform sizes available are 72 by 26 in., 80 by 26 in., and 90 by 26 in., all with a 4-in. ramp.

Collins Associates, Inc., P.O. Box 38, Cincinnati 11, Ohio

For more details circle 156 on Enclosed Return Postal Card.

Engine Generator

Wincharger Corporation's new "Winco Lite" portable engine generator is rated at 2500 watts but develops up to 3000 watts A. C. intermittent power with a weight of 123 lb. with carrying handle, according to the company. The

Wincharger Generator

control box contains one 15 amp. duplex receptacle, one 20 amp. 3-wire "Twist-Lock" receptacle, and one 20 amp 2-wire receptacle. The unit is also available with stationary base, 2-wheel dolly, or carrying cradle.

Wincharger Corporation, Sioux City 2, Iowa

For more details circle 157 on Enclosed Return Postal Card.

Lightweight Vibrator

A new electric concrete vibrator, with a 1-in. head, is announced by Vibro-Plus Products, Inc. This lightweight, one-man operated unit joins the ESV series and now makes available abrasion-resistant head sizes up to 1¾ in. The new units are said to be suited for work in areas where spaces is restricted, such as in prestressing and precasting where the operator works close to forms.

According to the manufacturer, the vibrator will stand up under rugged usage and excessive abrasion caused by prestressed strands, sides of forms, and the concrete itself. Frequencies range from 8,000 to 12,000 vpm, head lengths from 10 in. to 18½ in., and working

Vibro-Plus Products, Inc., Stanhope, N. J.

For more details circle 158 on Enclosed Return Postal Card.

FOR RENT NEW INGRAM ROLLERS

SEE YOUR DEALER OR CONTACT...

Acme IRON WORKS

CULEBRA AVE. AT EXPRESSWAY N. W.
P.O. BOX 2020 • SAN ANTONIO 6, TEXAS

FOR SALE

1951 Lorain Backhoe, Model TL-25K, 1600 hours, $9,800.00

1957 Model 933 Caterpillar one-cubic-yard Front End Loader, 70%, $6,800.00.

A. S. Johnson Company

3311 Jennings Rd., Cleveland 9, Ohio

Shadyside 1-0214

CIVIL ENGINEER

OVERSEAS ON HIGHWAY PROJECT IN THAILAND

Require recent graduate Civil Engineer with some construction inspection and survey experience. Twenty month contract in bachelor status. Must pass physical examination and security investigation.

- EXCELLENT SALARY
- OVERSEAS BONUS
- COMPLETION BONUS
- EXTRA VACATION ALLOWANCE
- MEDICAL CARE & INSURANCE

Write fully, include complete salary information to:

SVERDRUP & PARCEL ENGINEERING CO.

915 Olive St., St. Louis 1, Missouri

LOOK!

ONE THIRD OF ORIGINAL PRICE

All Equipment In A-1 Condition. Send For Additional List.

1—Compton Auger—Model 28 with Cummins engine and Cummins Air Auxiliary, 30" steel head, skid operated. $35,000.00

3—Lima Shovels Model 1201 with Cummins engine, new Dipper, 3 yd. 34'6" boom & 27 stick, light plant. Each 35,000.00

1—Bucyrus-Erie Shovel, 22B with International motor, light plant.. 24,000.00

2—Sullivan Air Compressors, Model 1 WK-60, size 210 with Cat motor. Ea. 1,000.00

1—1957 Ford Truck, Model 250, A-1 condition. List for $1,550.00. Our price 1,295.00

EQUIPMENT, INC.

Route 61 - Montgomery, W. Va.
Phone HI 2-2291 - Night HI 2-8124

LOOK

To Eugene, Oregon For BARGAINS

Archs Logging—All sizes
Backhoes & Loaders—Ford, Case, John Deere and Ferguson
Bunkers—20 cy., 40 cy., 3 compartments
Compressors—Schramm, New and Used, 105-210, Etc.
Crushing Plants (Rock)—Used Stationary and Portable
Cranes, mobile—Lorain and Bucyrus-Erie. Used.
Cranes, crawler—T9 International. Used.
Conveyors all sizes, used.
Chain Hoists 2½ ton to 12 ton—Used.
Chain Surplus (Used) for dragline buckets.
Dumpsters, used. Good Bargain.
Drum Hoist—2 and 3 drums
Generators—25 to 75 KW, Bargains
Grader Road—Adams, Wehr and Caterpillar
Log Trucks—Long and Short Loggers. Good Buys
Motors—(Waukesha) 15 HP. Surplus
Motors—Electric all sizes—Used.
Oil Heaters (New), Low prices
Pulley, 4' Diameter. Surplus
Power Plants (Industrial), All Sizes
Sockets 1" Drives, all sizes. ¼ price
Shovels (Dragline) ½ cy. to 1½ cy. capacity
Suction Hoses—All sizes—2" to 6", Used.
Steam Cleaners—New and Used. Reasonable
Trucks, Trailers, Low Boys, Tractors and Flat Beds
Tractors—all sizes with winches
Trenching Machine—407 Buckeye. New ½ price
Winches—8N, 7N. Give away prices.

MIDWAY MACHINERY & SUPPLY CO.

3521 Franklin Blvd. Eugene, Oregon
DI 5-2327

FOR SALE

CRANE BOOMS

Surplus 22B, 40', includes 5' section.....$925.00

Model 414 Lorain Pin Type, 35', includes 10' section 750.00

(2) Large Locomotive Booms to fit Crawler Cranes - (1) Measures 67" x 62" - 60' long... 900.00

1 Measures 65" x 60", 60' long 800.00

Continental Equipment Co.

Box 832 - Cleveland 22, Ohio

BARGAIN PIPELINE EQUIPMENT

FOUR (4) Used Caterpillar Model D-8 Tractors, 2U Series, equipped with Trackson Model MD-8 Side Booms, located at Dodge City, Kansas. Fair Condition.

AS IS—WHERE IS $9,500.00

ONE used Caterpillar Model D-8 Tractor, IH Series, equipped with Trackson Model MD-8 Side Boom, Located at Albuquerque, New Mexico. Good condition.

BUY AND TRY $8,000.00

ONE Caterpillar Model D-6 74" Tractor, equipped with Trackson Model MD6 Side Boom, Trackson Model AF-6 Anglefiller, 14' boom, Guaranteed Machine. Located at Albuquerque, New Mexico.

CERTIFIED BUY $12,500.00

TWO (2) Used International Model TD-14 Tractors, complete with Cardwell Side Boom attachments. One Tractors equipped with anglefiller. Both in operating condition. Located at Albuquerque, New Mexico.

Tractor with boom and anglefiller $5,500.00

Tractor with side boom attachment only (no boom) $3,700.00

TWO (2) Hyster Model D8N Worm Drive Winches, complete with power take off shafts, control levers. Good Condition. Located at Albuquerque, New Mexico. .....$2,300 Each

R. L. Harrison Co., Inc.

P. O. Box 1320 Albuquerque, N. M.
Phone: CHapel 7-8811

TANDEM TRUCKS

5—1953 IHC 195 Diesel Tandems, Cummins Diesel Engines, 157" W.B. 2A45 Auxiliary, F54 5-Spd. Transmissions, Air Brakes, 28M Axle - Tires 10:00x20 Front, 9:00x20 Rear.

6—1954 - RF-190 Internationals 175 inch Wheelbase - 5 Speed Transmission 3-Way Auxiliary.

7—1956 F-900 Fords with Tag Axle F54-5 Spd. Transmission, 3-Way Auxiliary Transmission. Equipped with 8-10 yd. Anthony Dump Bodies.

A. J. RHIAN
Phone North 5-2527
YANKTOWN, SOUTH DAKOTA

CALL UPON *MUTUAL* FOR THE NATION'S LARGEST

PARTS STOCK

Headquarters All Heavy-duty Equipment, Supplies & Parts

• DUMP TRUCKS • LOADERS • CRANES • ENGINES

Lowest Prices - Complete Satisfaction Guaranteed

NEW and Guaranteed REBUILT ENGINES

Completely Dynamometer "Run-In" and Tested in our own modern extensive rebuilding shops.

- HERCULES
- CUMMINS
- CONTINENTAL
- WAUKESHA
- GMC DIESEL

25TH YEAR OF QUALITY SERVICE TO THE HEAVY EQUIPMENT INDUSTRY!

MUTUAL TRUCK PARTS Co., Inc.

2000 S. WABASH AVENUE
CHICAGO 16, ILLINOIS

Telephone: CAlumet 5-3500

CONTRACTORS!

An exclusive Dealer Franchise may be available in your area in this profitable & rapidly growing industry.

For details without obligation write

CARDINAL POOLS, INC.
11525 N. Central Expressway
DALLAS, TEXAS

USED ASPHALT DISTRIBUTORS FOR SALE

1270 Gal. Capacity—Price $2500.00
Autocar Chassis

1250 Gal. Capacity—Price $3500.00
1952 (F-750) Ford

1700 Gal. Capacity—Price $5000.00
Autocar Chassis
5000 Gallon Supply Tank
Trailmobile Semi-Frameless
3 Compartments—Price $1250.00

E. STEWART MITCHELL, INC.
3301 Ridgewood Ave., Baltimore 15, Md.

BARGAINS ON GRAVEL EQUIPMENT

Used 18" and 24" Pioneer Lattice type Conveyors in lengths from 45' to 140'.
Used Eagle 20' Single Sand Scalping Tank
Used Telsmith 24" x 20' Sand Screw.
Eagle 44" x 32' Sand Screw (Used).
Used Eagle 7' x 30' Log Washer.

Contractors Machinery Co.
13200 North End Ave. - Phone: JOrdan 6-6320
Detroit 37, Michigan

FOR SALE

Blaw Knox Dual Drum 34-E Paver Powered with 671 GMC Diesel Engine. S/N 46D704 New 1954. Has not worked since 1957. Located in Southeast. Write Box 1224, Roads & Streets, 22 W. Maple St., Chicago 10, Ill.

DEPENDABLE USED MACHINES
Lorain 20 ton truck crane
Austin 8 ton roller KT-142
Bay City #25 ½ yd. dragline
D-311 Caterpillar Power Unit
Willard 3 yd. mixer on Ford truck
Terratrac #500 w/backhoe & trailer

TRACTOR & EQUIPMENT CO.
10032 Southwest Highway, Oak Lawn, Ill.

WINCHES & HOISTS

Steam Hoists

1—10 x 12 Mead-Morrison, 3-drum, 14,000#
1—8¼ x 10 American Hoist, 3-drum, 9,500#
1—10 x 12 Washington, 3-drum, 20,000#
1—2½ x 15 Lidgerwood, 2-drum, 30,000#
1—8¼ x 10 American Hoist, 2-drum, 9,500#
1—6 x 8 Lidgerwood, 2-drum, 6,000#
3—Steam Swinging Engines, 10,000-12,000#
1—7 x 9 Clyde, 2-drum, 9,000#
2—8½ x 10 Clyde, 2-drum, 16,000#

Electric Winches

10—Vulcan-Denver 1-drum, 14,000#, 50 H.P., 230 V.D.C.
6—Bayard 1-drum, 15,000# @ 42 fpm, 20 H.P. motors
5—Clyde 1-drum, 4,000 to 7,000#, 30 to 60 H.P., All A.C.
2—Jaeger 1-drum Towing Winches, 32,000#, 15 H.P., 115 V.D.C.
2—Electrolift Overhead Trolley Hoists, 6,000#, 208 V.A.C.
4—Lake Shore Type "C" Cargo Winches, 14,000#, 230 V.D.C.
7—Montgomery Davitwinches (2 - gypsy), 5,500#, 5 H.P., 115 V.D.C.
2—Clyde Dredge Hoists, 2-drum, 20,000# @ 50 fpm.

Gasoline and Diesel Hoists

4—Jaeger, 1-drum, 50,000# @ 10 fpm, 150 H.P. Continental gas engine and torque converter
1—OK Hoist, 2-drum, 8,000# @ 200 fpm - JXD Hercules gas engine.
4—Bayard, 1-drum, 16,000#, Hercules engines.
1—Link Belt, 3-drum, 60,000#, Diesel driven drums hold 4,500' of 1" cable.
4—Lidgerwood, 1-drum, 5,000#, Waukesha engines.
1—Jaeger, 1-drum, 13,000#, Continental engine.
1—American Hoist, 3-drum, 10,000#, GM diesel or gasoline engine.
1—Parkersburg, 1-drum Coring Reel, 125 H.P. Buda gas engine.

Derricks

1—65 ton, 35' rad. Bedford Guy Derrick, 90' boom, 105' mast.
1—12 ton, 35' rad. Guy Derrick, 76' boom, 93' mast.
1—5 ton Stiffleg Derrick, 30' boom, 20' mast, A.C. powered.
1—3 ton Stiffleg Derrick, 18' boom, 16' mast.

Miscellaneous Equipment

2—500 CFM Worthington Air Compressors, D-13,000 Cat diesel powered.
12—Chrysler 125 H.P. gas power units, IND-14A.
40—Anchor Windlasses for 1" to 1¼" chain, electric power.
30—Capstans, Hand & electric powered.
2—Clyde Swinger Attachments, 10,000#
10—Maxim Silencers for 6-71 GM diesels (new), $45.00 ea.
3—Webster-Brinkley steering gears for 80' to 100' vessels.
2—Ingersoll-Rand Utility Hoists, 1,000# (Air)
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2100 x 29, 20 ply tires, 14 yd. struck, 17½ yd. heaped. Serial #20 & #42.

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CONSTRUCTION EQUIPMENT

Friday, Oct. 16th, WILMINGTON, OHIO, 9 AM (EST). A very large sale, every piece belongs to D. W. Winkelman Co., Inc. Write-Wire auctioneers for full sale bill. EACH PIECE POSITIVELY SELLS—NO-BID-INS-NO-BUY-BACKS-NO-MINIMUM-PRICES!

2 Cat D9's; 5 Cat D8's 15A & 14A's w/dozers; Cat D8, 13A w/hyd dozer; 7 Cat D8's; 2U's all w/dozers; 8 IHC TD-24's, 2 are 241 series, one w/dozer; Cat D7 & 2 Cat D6's & Cat D4 all w/dozers; P&H 955A dragline 2½ yd, Waukesha diesel, 100' boom; 955A shovel front; Lorain 820J drag, 70' boom, Waukesha diesel; Loraine L80 drag, 70' boom, Cat D13000; 820J shovel front & L80 or 820J backhoe attchmt; Lorain L50-I drag, 60' boom, Cat D318; L50 backhoe attchmt; NW 25 trk-crane, 65' boom, 15' jib; 3 Lima 34's, one backhoe & 2 draglines, Cat D318 or GMC 371; Concrete, clam & drag buckets; LeT-W 'D' Roadster; LeT 'D' Tournapull; 3 Euclid S-18 Motor Scrapers, GMC 6-110's; LeT-W 'C' Roadster; LeT 'C' Tournapull; 6 Cat DW-21 Motor Scrapers, 8W's; 3 LeT 'B' Tournapulls, Cummins 300 hp engines.

8 Cat #12 motor graders, all 8T's, hyd steer & scarifiers; 3 Adams 440 motor graders, hyd steer, scarifiers, cabs, less than 1000 hours; Michigan 175 AD loader; Trojan 103 Loadster; AC HD-11G tractor loader; IHC I-350 w/Pippin backhoe & Loader; 3 LeT 'FP' Scrapers; Parsons 220-2A & Buckeye 12 trenchers; 4 LeT-W & Gebhard 60x60 and other sheepfoots; LeT 'C' Tractor w/hitch & LeT-W 60x60 sheepfoot; Ferguson 50 ton pneu roller; Ferguson 3 & 3-5 ton tandem, Huber & Galion 10 ton 3 wheel & B-S 10-12 ton 3 wheel rollers; Jackson & 4 International VT6-4 Vibro tampers; C-P 900 cfm rotary, 2 I.R. 210 cfm Gyro's & other compressors; 5 Rome tandem discs; Fleco tree dozer & Fleco rock rake for D8's; Rogers 25KW generator w/Cummins diesel, 27' folding tower; 2 Schoonmaker 30 KW lite plants & towers; IHC 25KW generator & tower; smaller generators & plants; Buckeye FG-24 Finegrader; Maxon Dumpcrete spreader; Jaeger X Transverse Finisher; Flex-Plane float-finisher, quick change; Ferguson #25 Vibrator; Clary power screed; Foote 34E dual drum paver; Flex-Plane hyd transverse finisher; vib screeds; Flex-Plane automatic & 2 other spray machines; Clipper AC-40 joint sealer; Koehring 56S stationary elec 2 yd horiz mixer; BG car unloader; 24"x54' conveyor; 6 Gar-Bro concrete power buggies; much other concrete equip; 2 Jersey spreaders; Euclid 6000 gal water wagon & Euc 25FDT tractor; water trailers & water trucks; Fuel trucks; 39 trucks & pickups; Jahn 30 ton tandem & Rogers 20 ton lowboys; 32' tandem float; Office & van trailers; Thurman portable 40 ton truck scales; pumps.

GE & Motorola 150 Watt Radio base stations; 5 GE & 18 Motorola mobile trans-receivers; LeT K30 & Cat 28 rippers; DelMag D-12 pile hammer; McCarthy 106-24 vertical earth drill on FWD; welders; air tools; portable 40x60 steel shop bldg; Parts; shop tools; many pieces too numerous to list.

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1—Caterpillar D-8 Tractors, S/N 2U-848 and 2U-5002, each with cable bulldozer, Model 25 cable control, and LeTourneau LP 15 Yard Scraper.

2—Caterpillar D-7 Tractors, S/N 7M-1684 and 7M-2372, each with cable bulldozer, Model 25 cable control, and Allis-Chalmers Model 108 9 Yard Scraper.

1—Caterpillar Model D7 Tractor, S/N 7M-9162, with Hyster Winch.

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2—Allis-Chalmers Model HD-19 Tractors, S/N 187 and 522, each with double drum cable control and pusher plate.

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PGH 150 & 255-A Hoe & Shovel Attachments, several, low priced.

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Truck Mounted Winch Crane, White truck, 30 Ft. boom, good yard crane, low priced.

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1—Model D Allis Chalmers Motor Grader
2—¾ yd. Koehring Model 304 Cranes
1—1 yd. Link Belt LS-98 Dragline New 1954
1—HOD Hough Front End Loader New 1956
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COOK BROTHERS TRUCK & EQUIPMENT COMPANY, Oakland, Calif. is now a distributor for the complete Koehring construction equipment line in northern California and northwestern Nevada. Cook Bros. have sold and serviced products of the Parsons, C. S. Johnson and Ko-Cal divisions for some time and now are adding the Koehring, Buffalo-Springfield, Kwik-Mix and Ka-Mo lines.

J. E. "JIM" SHEETS has been named Eastern Sales Manager for LeTourneau-Westinghouse Company, Peoria, Illinois. The appointment which is effective immediately, places him in charge of operations of the company's eastern sales division which includes 22 states and 5 Canadian Provinces. He succeeds D. H. Mitchell, who recently resigned this position.

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With the Manufacturers and Distributors

E. B. ENGLISH, MANAGER, Defense Products Department, Caterpillar Tractor Co., has been appointed to the United States Chamber of Commerce's National Defense Committee for the coming year.

YALE & TOWNE MANUFACTURING CO. has appointed Edward D. Hoban as Chief Engineer – Government Contracts, in order to establish closer liaison between the engineering capabilities of Yale Materials Handling Division, and governmental requirements for materials handling equipment.

ALFRED KAUFFMANN, former president of the Link-Belt Company, manufacturers of chain and conveyor belts, died recently at age 70. He had held the presidency of his firm for forty-one years.

EXPANSION OF ITS PRODUCTION facilities by purchase of a 100,000 sq. ft. plant in Kent, Ohio, is announced by R. D. Fageol Co. The firm manufactures Fageol Flasher Safety Lights, widely used in construction work.

LOAD COEFFICIENTS

(Continued from page 105)

$$\frac{1}{P} \times V = 1.819$$

and the maximum shear due to live load plus impact is determined as follows:

$$V_{max.} = 1.819 \times 25.6 \times 1.29$$

$$= 60.07 \text{ kips}$$

for an allowable shearing stress of 11,000 psi, the required net web area is:

$$A = \frac{60{,}070}{11{,}000} = 5.46 \text{ sq. in.}$$

From the above computed controlling criteria, viz:

$$A = 5.46 \text{ sq. in.}$$

$$S = 416.27 \text{ in.}^3$$

$$I = 10{,}675.36 \text{ in.}^4$$

it is found that a $\frac{36 \text{ WF } 182}{36 \text{ WF } 182}$ is satisfactory.

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WORKERS JOB CLASSIFIED

(Continued from page 118)

levers to discharge concrete from drum. This small machine is sometimes charged by shoveling in the proportions of materials directly into the mixing drum, and some others have a skip into which materials are shoveled before being hoisted into the mixing drum. Rinses drum with water to remove adhering concrete. May oil, grease, or otherwise service and make necessary adjustments as needed. May perform other related duties.

MIXER, CONCRETE (PAVING).—Moves hand and foot levers to operate a paving machine that mixes and dumps concrete, the machine consisting primarily of a skip, concrete mixer, and a boom equipped with a traveling bucket, and a power plant, all mounted upon a crawler unit or upon a wheel unit. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

MOTOR GRADER.—Rides in control cab of motor grader and moves levers and hand-wheels to guide machine and regulate the scraper blade. Blade is mounted on a carrying and turning circle at the front of the machine. Equipment is used in leveling dirt to grade and in laying asphalt and flexible base materials. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

OILER.—A serviceman who lubricates the moving parts of wearing surfaces of mechanical equipment; changes oils, greases, and filters; refuels equipment. Uses grease guns to force grease into bearings. Packs grease cups by hand. May assist mechanic in assembling, setting up, adjusting, maintaining and repairing all types of construction equipment. May when servicing equipment drive a truck which carries fuels, oils, and greases. May use the tools of the trade at and under the direction of a mechanic. May perform other related duties.

ROLLER-GRID, SHEEPFOOT, OR 50-TON PNEUMATIC.—Operates a crawler tread tractor to pull a grid, sheepsfoot, or extra-heavy pneumatic roller, which is used to compact earth fills, flexible bases, etc. Operates tractor by manipulating throttle, levers, pedals, and steers tractor by working levers or pedals which individually control both crawler treads. May oil, grease, or otherwise service equipment as needed. May perform other related duties.

ROLLER-PNEUMATIC (SELF-PROPELLED).—Operates a Diesel or gasoline driven machine which has pneumatic tires mounted beneath a frame upon which the operator controls the machine. The number of tires varies from 6 to 12 and the weight of the roller is variable with different machines. Machine is used to compact earth fills, subgrade, flexible bases and bituminous surfaces. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

SCRAPER.—Drives a tractor to pull a steel bowl-like scoop (scraper), mounted on wheels, that scrapes up earth and transports its to a designated place; manipulates a series of levers to lower cutting edge of scraper into ground to raise cutting edge when scraper is full, and to empty scraper. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

TRACTOR (CRAWLER TYPE).—Operates a Diesel or Gasoline powered crawler tread tractor to pull graders, rock wagons-rippers pushes or pulls self loading scrappers when push block is mounted on front of tractor or cable is used from drawbar. Operates tractor by manipulating throttle, levers, pedals, and steering it by working levers or pedals which individually control both crawler treads. May oil, grease or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

TRACTOR, PNEUMATIC TIRED (OVER 50 H.P.).—Operates a large Diesel powered 4-wheel-pneumatic tired tractor which is used to pull pneumatc rollers, hauling equipment and other miscellaneous operations a rubber-tired tractor can be used for. Tractor is operated by steering with wheel and brake clutch. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

TRENCHING MACHINE.—Moves levers to operate a power-driven machine that digs trenches for sewer, water, drainage, oil, and gas pipe lines. The trenching machine is mounted on crawler treads or rubber tires with the digging equipment usually consisting of an endless chain or wheel of edged buckets

that excavate and deposit the material on a conveyor belt which in turn discharges the material at the side of the trench. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

Truck Drivers

ASPHALT DISTRIBUTOR.—Drives truck equipped with tank and controls for regulating distribution of bituminous materials for highway surfacing. May oil, grease or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

DUMPTOR.—Operator of a self-propelled, 4-wheeled, rubber-tired, truck type machine which is used in hauling of materials. Machine is normally used off the highway, working around rock crushers or excavation. Being reverse steer, the operator rides facing the dump-bed which is dumped by release of safety lock and sudden stop of machine, which causes offcenter loading of truck bed to dump. May oil, grease, or otherwise service and make necessary adjustments to equipment as needed. May perform other related duties.

DUMP OR BATCH TRUCK (UNDER 8 C.Y.).—Drives a truck for transporting loads of construction materials. May service and make necessary adjustments for proper operation of equipment. May perform other related duties.

FLATBED TRUCK (1½ TON OR UNDER).—Drives a truck for transporting loads of construction materials or equipment. May load and unload truck. May service and make necessary adjustments for proper operation of equipment. May perform other related duties.

LOWBOY (LIGHT EQUIPMENT).—Drives a gasoline or Diesel powered truck to which is attached a trailer with a low frame or bed upon which heavy equipment or material is hauled. May service and make necessary adjustments for proper operation of equipment. May perform other related duties.

PICKUP TRUCK (¾ TON OR UNDER).—Drives a light truck for transporting small loads of construction materials, tools, or equipment. May service and make necessary adjustments for proper operation of equipment. May perform other related duties.

SERVICE STATION ATTENDANT.—Maintains service station. Washes, lubricates, fuels, and otherwise services vehicles and equipment. Changes and repairs tires and tubes. Operates and maintains service station equipment. May perform other related duties.

SPREADER BOX.—Hooks spreader box to tailgate of truck, adjusts hopper and strike-off blade so that gravel, stone, or other material may be spread to a specific depth on road surface. Controls flow of materials when spreading. May perform other related duties.

SPREADER BOX (SELF-PROPELLED).—Drives a self-propelled vehicle, consisting primarily of a hopper mounted on pneumatic-tired wheels, used to spread crushed aggregate on bituminous roadway material. May service and make necessary adjustments for proper operation of equipment. May perform other related duties.

SWAMPER—Assist truck driver. Shares with a driver the duties of loading and unloading a truck, shifting articles about on truck and in handling cumbersome articles; may drive to relieve driver. May perform other related duties.

TRUCK OR TANK TRUCK (EXCLUSIVE OF TRAILER OR SEMI-TRAILER).—Drives a truck on the chassis of which is mounted a flatbed (over 1½ ton capacity), tank, or other special body for the transporting of construction materials or equipment. May service and make necessary adjustments for proper operation of equipment. May perform other related duties. Excludes portable tanks mounted temporarily in dump truck bodies.

TRUCK OR TANK (WITH TRAILER OR SEMI-TRAILER).—Performs duties of the same nature as described under "Truck or Tank Truck (Excl. of Trailer or Semi-Trailer)." Excludes portable tanks mounted temporarily in dump truck bodies.

WAREHOUSE MAN.—Maintains warehouse for construction supplies and materials. May operate necessary equipment and machinery within warehouse area. May perform other related warehouse duties.

WINCH TRUCK.—Drives a heavy duty gasoline or Diesel tandem axle truck equipped with a winch and gin poles for picking up various objects; backs truck to position over object to be hoisted, erects gin poles, fastens cable, shifts levers to connect winch to truck motor, operates winch. Shifts winch gears in accordance with signals from helper on ground. May service and make necessary adjustment for proper operation of equipment. May perform other related duties.

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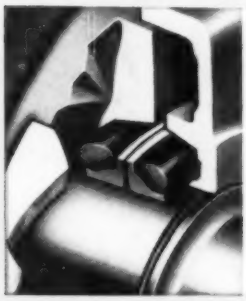
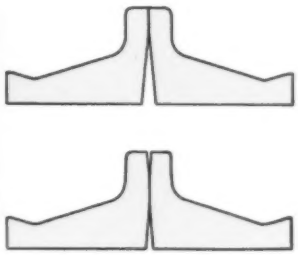
New floating ring seal . . . wear does not decrease efficiency. The roller seal employs two metal alloy and two rubber "O" rings. The metal rings, much harder than file steel, have





lapped faces . . . smoother than glass. These faces taper slightly toward the inner edge forming a sealing area at the outer edge. As wear occurs, the sealing area moves inward, maintaining a perfect seal through thousands of hours.

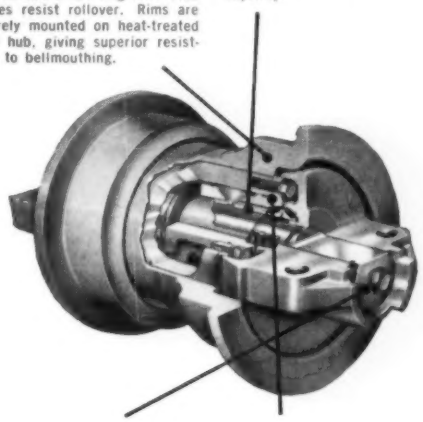
The "O" rings keep constant pressure on the metal rings. Lubricant can't get out. Grit can't get in. There are no springs or diaphragms to weaken, wear or become damaged. "O" rings are made of special compound to resist oil, heat and cold.

Millions of hours of proof—the toughest track roller yet. Cat lifetime lubricated rollers have been subjected to extensive and exhaustive on-the-job tests *for over 5 years*. Working under all types of job conditions, these time-tested rollers have proven unequalled. Their success is further amplified by new machine owner reports—for low-cost performance and minimum maintenance, Cat lifetime lubricated rollers can't be beat.

MANY OTHER NEW FEATURES THAT EXTEND TRACK ROLLER LIFE

RIMS — made from forged steel. Deep-hardened for long life. Wide flanges resist rollover. Rims are securely mounted on heat-treated steel hub, giving superior resistance to belimouthing.

BEARINGS have high load carrying capacity.



LARGE DIAMETER SHAFT is double heat treated, making it extra stiff and resistant to wear.

BUSHINGS contain large oil reservoirs for more lubricant and better cooling.

Easy installation is achieved by use of snap rings to hold the seals and end collars in position before mounting. End collar bolt holes will line up easily with track roller frame holes during installation.

Stop track roller greasing now with these lifetime lubricated rollers. See your Caterpillar Dealer. He will give you the complete story on this time-saving, money-saving undercarriage component.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

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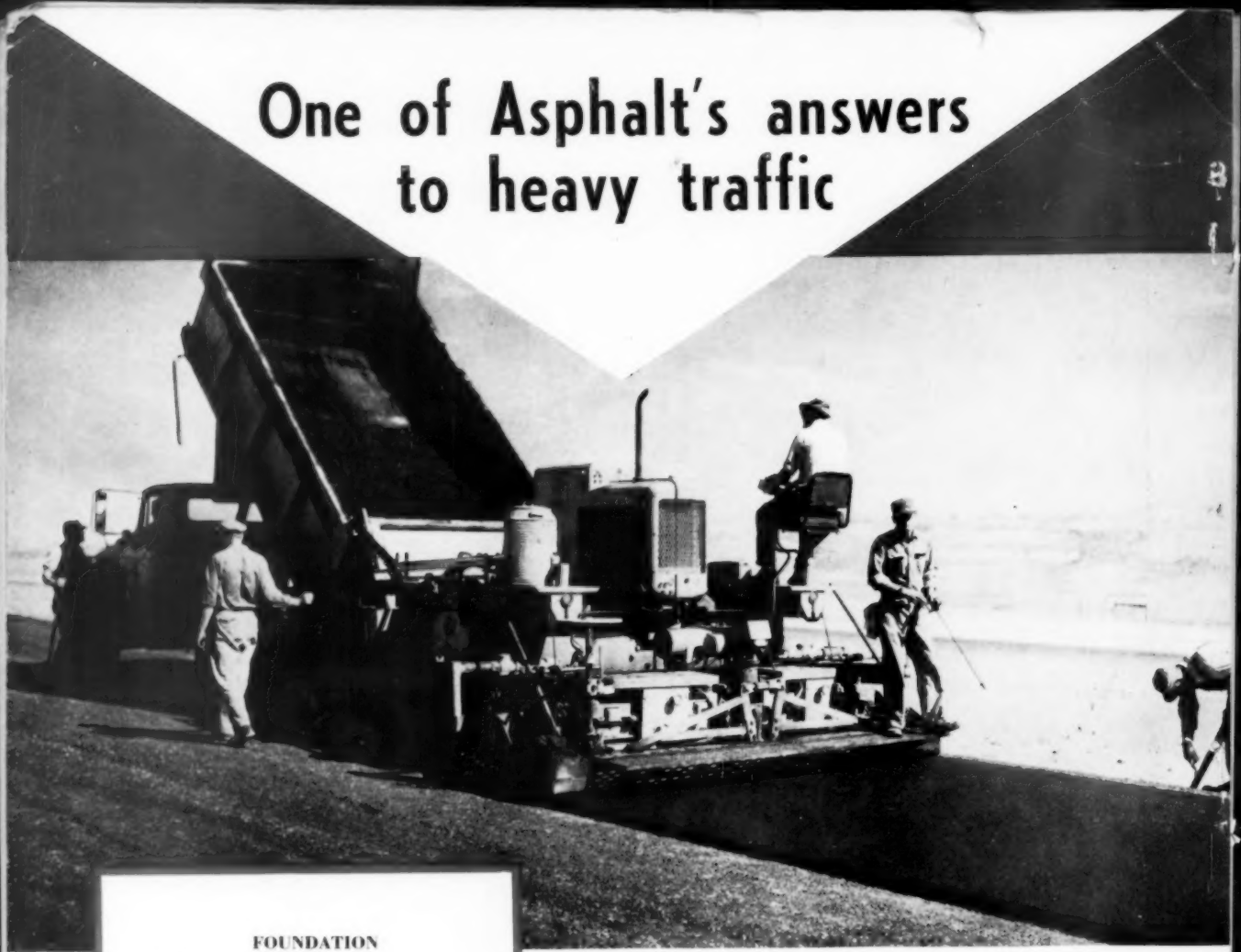
SERVICE TIP: When rebuild time finally comes, be sure to keep the metal rings matched in original pairs, being careful not to nick or mar the lapped faces.

. . . for more details circle 291 on enclosed return postal card

One of Asphalt's answers to heavy traffic



FOUNDATION

Asphalt Penetration Macadam, consisting of one or two courses of broken stone, penetrated by pressure distributor with hot, binding, waterproofing asphalt.

SURFACE

Plant-mixed Asphaltic Concrete, laid in two or three courses, according to the volume and weight of traffic to be served.

For heavily traveled Interstate and other primary highways, this combination of Asphalt Penetration Macadam foundation and Hot-mix Asphaltic Concrete surface is a sound pavement choice for a number of reasons:

Its rugged durability—best demonstrated under the 110,000-vehicle-a-day traffic of the New Jersey Turnpike.

Its lower cost—substantially lower than rigid paving designed for the same traffic, based on actual competitive bidding.

Its unequalled driving comfort—thanks to Asphalt's resilience and freedom from expansion joints.

In addition to which, Asphalt is immune to ice control chemicals—snow and ice melt faster on Asphalt—its dark surface prevents tiring glare and causes traffic lines to stand out sharply, day and night.

Helpful information for the road builder on the various heavy-duty, as well as the intermediate and low-cost types of Asphalt paving, is available in two free Texaco brochures. Our nearest office will be glad to send you copies. No obligation.

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